

INDIAN COUNCIL OF MEDICAL RESEARCH

Report of the Assessment Committee  
on the  
National Filaria Control Programme  
India

NEW DELHI  
1st JULY, 1961



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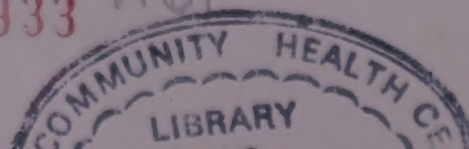


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# CONTENTS

	PAGE
I. INTRODUCTION ... ..	1
II. THE PROGRESS OF FILARIA CONTROL IN INDIA LEADING TO THE FORMULATION OF THE NATIONAL FILARIA CONTROL PROGRAMME ...	3
Introduction ... ..	3
The Orissa experiment ... ..	3
The National Filariasis Control Programme ... ..	5
Constitution and functions of Survey and Control Units ...	5
Staff pattern ... ..	10
Supplies ... ..	11
III. ASSESSMENT OF THE NATIONAL FILARIA CONTROL PROGRAMME (1955 to 59) ... ..	13
Survey Units ... ..	13
Control Units ... ..	15
Reaction to drug treatment ... ..	18
Public co-operation for mass treatment ... ..	20
Mosquito control operation ... ..	21
IV. RESEARCH IN FILARIASIS ... ..	28
1. Research in Epidemiology of the Disease ... ..	28
2. Factors related to Transmission—Entomological Research ...	29
3. Immunology of Filariasis ... ..	29
4. Clinical Studies ... ..	30
5. Therapeutic Trials ... ..	31
6. Animal Filariasis ... ..	31
V. LESSONS OF THE NATIONAL FILARIA CONTROL PROGRAMME (N.F.C.P.) AND RECOMMENDATIONS ... ..	32
Recommendations : ... ..	35
1. Control measures ... ..	36
2. Reorganisation of the existing control units ... ..	36



	PAGE
3. Pattern of organisation of the existing units ... ..	36
4. Constitution and functions of the new units ... ..	37
5. Assessment of results ... ..	39
6. Administration ... ..	40
7. Augmentation of Training at Malaria Institute of India and subsidiary centres ... ..	40
8. Filaria Section of State Health Department ... ..	41
9. Research-cum-Training Centres ... ..	42
10. Filaria clinics ... ..	42
11. Health Education ... ..	43
12. Financial implications ... ..	43
13. Suggestions for modification of existing units ... ..	44
14. Research ... ..	44
15. Other recommendations ... ..	44

## APPENDICES

I. A Pilot scheme for control of <i>B. malayi</i> in Kerala State ... ..	46
Annexure I. (Zonal staff) ... ..	50
Annexure II. (Budget) ... ..	51
Annexure III. (Calendar of activities) ... ..	53
II. The staff and operational cost of the Survey and Control Unit (all categories) in the States ... ..	54
III. Material to be made available by the State for the Survey Unit of National Filaria Control Programme ... ..	56
IV. Material required by the Control Unit of the National Filaria Control Programme to be supplied by the State Government except where stated otherwise ... ..	60
V. National Filaria Control Programme—Forms ... ..	66-89
VI. Percentage of treated individuals who developed reactions during Mass Drug Administration under the National Filaria Control Programme (Unit-wise analysis) ... ..	90
VII. Results of mosquito dissections ... ..	91
VIII. Cost of Headquarters Unit ... ..	94
IX. Rural-Research-cum-Training Unit ... ..	95

	PAGE
X. A scheme for establishing filariasis clinics attached to large hospitals in the States where filariasis is endemic. ... ..	97
XI. Population at risk—Urban and Rural. ... ..	100
XII. Types of Unit—Pattern of staff and supplies. ... ..	101
XIII. Details of requirements of States—Number, type of units and financial implications (for urban areas only) ... ..	111
XIV. Pattern of staff and supplies suggested to be provided to each filaria control unit. ... ..	113







## I. Introduction

THE Ministry of Health, Government of India, had appointed a Central Working Group for the purpose of formulating specific proposals in several fields of public health for implementation during the Third Five-Year Plan period. The Working Group, at one of its meetings, suggested that it was desirable to assess the progress made by the National Filaria Control Programme in order to have specific data on which to base any future recommendations for the control of this disease in the country. The Director-General of Health Services, New Delhi, in his letter No. 5-20/60. PHI, dated 24th June, 1960, requested the Indian Council of Medical Research to form a Committee for the above purpose. Accordingly, the Director of the Indian Council of Medical Research constituted a Committee with the following members for evaluating the National Filaria Control Programme :—

1. Dr. C.G. Pandit,  
Director,  
Indian Council of Medical Research,  
New Delhi.
2. Dr. T.B. Patel,  
Director of Public Health,  
Gujarat, Ahmedabad.
3. Dr. N.V. Bhaduri,  
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4. Dr. S.P. Ramakrishnan,  
Director,  
Malaria Institute of India,  
Delhi.

(Convener)

At a preliminary meeting held in September, 1960, the Director, Indian Council of Medical Research and the Convener discussed the programme of work of the Committee.

It was noted that a card index giving a complete summary of the various activities of the Filaria Control Units had been prepared. The data on the cards were based on the periodic returns which had been received at the Malaria Institute of India from the units in the participating States. The data collected regarding the staff position, organisation and other details and the indices of assessment had also been incorporated in the above indexing system. In addition, the Director, Malaria Institute of India, and his colleagues had prepared a critical review of the National Filaria Control Programme for the period of 1955-59 based on a detailed analysis of the data collected from the units working under the programme in the different parts of the country. The information contained in the above documents



was utilised by the Committee in their assessment of the current filariasis programme.

It was also considered desirable that the Committee should visit some centres in a few of the participating States under the National Filaria Control Programme and hold discussions with the State Directors of Public Health or Directors of Medical Services to elucidate their views on the progress of the programme in their respective States, the difficulties and deficiencies met with in the organisation, planning and operation of the Programme and their suggestions for revising the Programme in the light of the experience gained during the past 5 years of operation. It was also decided to send out a questionnaire to all the concerned authorities in the States in order to obtain information on the points listed above.

In the following report, the Committee present their findings on the progress made in the National Filaria Control Programme, based on the documents referred to above and make their recommendations for the re-organization of the Programme of implementation in the Third Five-Year Plan period.

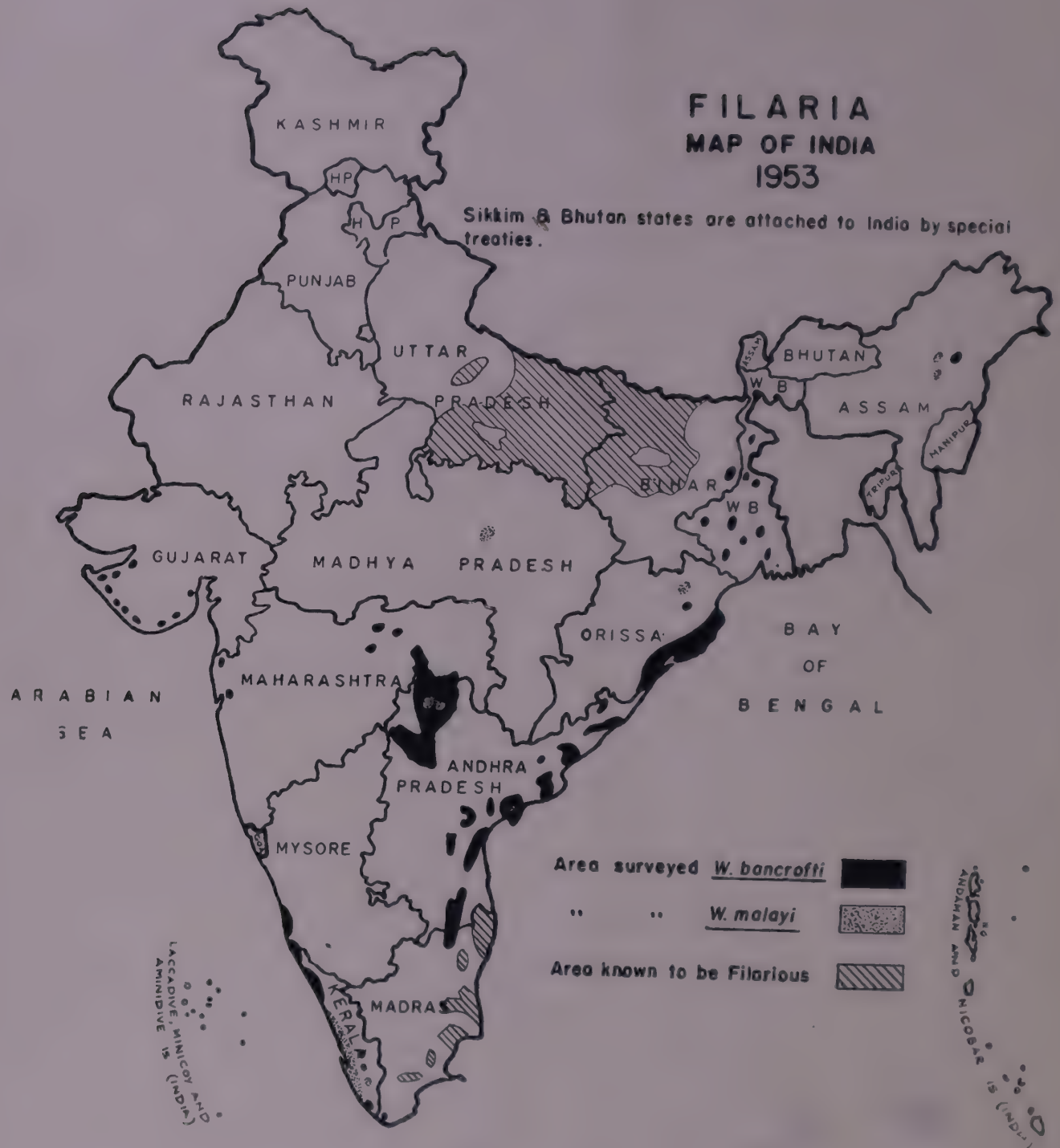
In conclusion the Committee wishes to express its sincere thanks to all the representatives of States with whom they had had discussions and for the valuable suggestions they had given during such discussions.

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MAP I.





## II. The progress of filaria control in India leading to the formulation of the National Filaria Control Programme

### INTRODUCTION :

Filariasis as a public health problem in India and its control were discussed in detail by Jaswant Singh and Raghavan (1953)<sup>1</sup>. The available data regarding the prevalence of the disease in the country were depicted by these authors in Map 1. The infection is widely distributed in India; the only States which are at present probably free from indigenous infection are the Punjab, Himachal Pradesh, Jammu and Kashmir and Rajasthan. The publication contains detailed information regarding the prevalent types of filarial infections, their vectors and the various factors related to the epidemiology of the disease. Based on the available information, the above authors estimated that about 25 million people were living in known filarious areas in India. The article also gave a brief description of the control measures that had been in force and emphasised the new outlook regarding the control of filariasis, due to advances in the fields of insecticides and chemotherapy.

### THE ORISSA EXPERIMENT :

The advent of synthetic insecticides and the introduction of diethylcarbamazine for the treatment of the disease raised the hopes of controlling filariasis. Accordingly, an experimental project for the control of Bancroftian filariasis was initiated in the Orissa State in 1949, jointly sponsored by the State Government, the Indian Council of Medical Research and the Malaria Institute of India. The objectives and the plan of work of the project were as follows :—

1. To determine the dose schedule that would be suitable for mass administration of diethylcarbamazine ;
2. To evaluate separately the suitability of each of the following methods in the control of the disease, viz :
  - (a) Mass drug administration on the basis of the selected dose scheduled under (1) above.
  - (b) Recurrent anti-larval measures, and
  - (c) Recurrent anti-adult measures by indoor residual spray of DDT in doses of 100 and 200 mg. per sq. ft.
3. To assess the results of the above measures by the following indices regularly collected at specific frequencies :

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1. JASWANT SINGH and RAGHAVAN, N.G.S. (1953) *Bull. Nat. Soc. Ind. Mal. Mosq. Dis.*, **1**, p. 237.

- (a) Vector density ;
- (b) Infection rate in the vector ;
- (c) Infectivity rate in the vector ;
- (d) The prevalence and the number of attacks of fever, lymphadenitis, lymphoedema, etc., per person at monthly intervals, and
- (e) Microfilarial rate in the community determined by annual surveys.

} Weekly

The Project terminated in 1955. A detailed report of this experimental study has been published in the Technical Report of the Scientific Advisory Board of the Indian Council of Medical Research<sup>2</sup>.

The results of five years' observation showed that all the three methods of control were effective in some measure or the other. Each one of them had its drawbacks also. It seemed that a multiple approach using all the three methods was essential for the control of filariasis.

Based on the results of the Orissa experiment, as well as of similar trials elsewhere in the world, the Government of India decided to initiate a programme for the control of Bancroftian filariasis in the country. This programme called the National Filaria Control Programme was launched with the co-operation of U.S.T.C.M. during 1955-56.

It must be mentioned, however, that the programme took into its fold only the problem of *W. bancrofti* which is by far the more extensive problem in the country. Control of *B. malayi* was excluded during the present planning for the following reasons :—

- (a) Knowledge was meagre regarding the methods of control of that infection which has a restricted distribution in the country ;
- (b) the vector has peculiar breeding habits and the methods of control needed to be studied, and
- (c) severe reactions were observed following the administration of diethylcarbamazine to persons with *B. malayi* infection.

However, studies on this aspect of *B. malayi* control have since been instituted in one of the highly endemic areas in India and the results of these investigations have shown that the vectors of *B. malayi* are amenable to control by insecticides. The Committee is, therefore, in agreement with the proposed pilot programme for the control of *B. malayi* in Kerala State submitted by the Director, Malaria Institute of India (Appendix I).

2. Technical Report of the Scientific Advisory Board of the Indian Council of Medical Research (1954) pp. 371-376.



## The National Filariasis Control Programme

### OBJECTIVES :

The programme had as its objectives ; (a) to carry out filariasis surveys in the different States of the country where the problem was known to exist in order to determine the extent of prevalence, types of infection and their vectors ; (b) to undertake large scale pilot studies to evaluate the known methods of filariasis control in selected areas in the different States, and (c) to train professional and ancillary personnel required for the programme.

Filaria survey and control units were to be established in the participating States to achieve the first two objectives, while arrangements were to be made at the Malaria Institute of India for the training of personnel.

### Constitution and functions of Survey and Control Units

#### FILARIA SURVEY UNITS :

While it was known that the filariasis problem in the country was considerable, a dependable estimate of the population at risk was not available. Almost the entire coastal belt in the country was known to be filarial. It is also known that both *W. bancrofti* and *B. malayi* are prevalent in the country, the latter having a very limited distribution mainly in the Kerala, Assam and Andhra Pradesh.\* While certain areas were recognised as filarial due to the presence of a large number of people with visible elephantoid swellings, the presence of filariasis in certain other areas was not noticeable due to the absence or negligible incidence of filarial disease. Enquiries and circular letters issued to the State Governments and data collected from hospitals and dispensaries and malaria units functioning in different parts of the country gave an incomplete picture. It was essential, therefore, to collect all possible data regarding the prevalence of filariasis to get a proper appraisal of the problem and institute control measures.

The survey units were expected to complete the delimitation of the problem during the first two years of their working. No further aid on this account was to be given by the Government of India. If the survey was not completed within the specified period, it was expected that the State Government would continue maintaining the survey units till the delimitation was completed. The completion of survey was expected to coincide with the allotment of new control units so that the staff could be readily absorbed in the control units.

Twenty-two survey units were allotted to the different States during the year 1955-56. Distribution of these Units is given on page 6.

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\*A focus of *W. bancrofti* var *vaucelli* was noted in the former Vindhya Pradesh, now Madhya Pradesh, by Dalip Singh and Raghavan, N.G.S. (1957) : *Bull. Nat. Soc.*, 5, 97.

State	Number allotted	Number established
Andhra Pradesh	3*	3
Bihar	2	2
Bombay (Saurashtra zone)	1	1
Madras	2	2
Madhya Pradesh	2**	2
Orissa	4	4
Uttar Pradesh	3	3
Kerala	2	2
West Bengal	3	Nil

\*Includes one for Hyderabad.

\*\*Includes one for erstwhile Vindhya Pradesh.

The Filariasis Survey Units had the exclusive assignment of getting a correct appraisal of the extent of filariasis and epidemiological data regarding the incidence of filariasis in the participating States. The units necessarily were to be mobile collecting epidemiological and entomological data.

#### THE CONTROL UNITS :

The function of the control units as mentioned earlier was to evaluate the known methods of filaria control in different areas of the country and on the basis of experience gained to evolve suitable measures for the control of bancroftian filariasis. It was for this purpose that the planning was restricted to covering only a limited population in the different affected States. In respect of the protection to be afforded the Control Units were to cover both urban and rural† areas, roughly in the proportion of 2 to 1.

Forty seven control units were allotted to the different participating States between 1958-59. The distribution of the same is given below. (For location of units please see Map III appended).

Andhra Pradesh	...	2.0
Assam	...	1.0
Bihar	...	8.0
Gujarat	...	3.5
Island Administration (Laccadive ; Andamans)	...	0.4

†The present classification of "rural" and "urban" areas is based mainly on the population without any reference to the mosquitogenic conditions like water supply, drainage, etc.

*C. fatigans*, the vector of *W. bancrofti*, breeds mainly in sullage and sewage collections. The conditions favourable for the breeding of this mosquito are considerably enhanced by the provision of piped water supply and latrines without concomitant drainage. It would, therefore, mean that though areas may be rural according to the generally accepted standards, they become urban for the filariologist when once these urban amenities are partially provided.



Kerala	...	6.6
Madras	...	4.0
Madhya Pradesh	...	1.0
Maharashtra	...	4.5
Mysore	...	1.0
Orissa	...	5.0
Pondicherry	...	1.0
Uttar Pradesh	...	8.0
West Bengal	...	1.0
		—
Total	...	47.0
		—

The activities of a control unit under the programme are as follows :—

- (a) Preliminary surveys,
- (b) Control operations : (drug administration and mosquito control operations) and
- (c) Assessment of the results.

#### (a) PRELIMINARY SURVEYS :

It was laid down that a rapid sample survey covering 3 to 10 per cent of the total population to be protected was to be carried out to determine the indices of endemicity in the community, prior to the institution of control measures. An index area, called the special study area, was to be selected with about 10 per cent of the total population (i.e. 30,000) under each unit ; an intensive survey of this special study area was to be carried out before the control operations and annually thereafter. A large sample of 10-15 per cent of residents, including about 500 children between 1 to 5 years of age and another 500 between 6 to 10 years was to be examined during these surveys to enable proper appraisal of the results. Such stratification was considered essential, as in the control of a disease like filariasis the reduction of transmission could best be demonstrated by the absence of new infection in the younger age groups, particularly those born since the commencement of the control activities.

It was required that each unit should select a comparison area with a population of about thirty thousand outside the control zone. The epidemiological and the filariogenic conditions in the two areas were to be, as far as possible, identical. No control measures whatsoever were to be carried out in the comparison area. The epidemiological and entomological data similar to those collected from the special study area had necessarily to be collected from the comparison area also, both initially and annually during the follow-up period,

(b) **CONTROL OPERATIONS : DRUG ADMINISTRATION AND MOSQUITO CONTROL MEASURES:**

Any measure adopted to bring about a reduction of the reservoir factor will contribute towards reduction of transmission of the disease. It would appear logical to select those persons in the community with microfilariae in the peripheral blood and give them a course of treatment. While on theoretical grounds this is correct, from the practical point of view this procedure is not feasible for the following reasons :—

1. This would necessitate examination of night blood of every member of the community.
2. One examination is often not enough and repeated blood examination may be necessary to detect the infection or to declare a person negative.
3. The microfilaria carriers in many instances are free from any symptoms, and do not readily subject themselves to an examination. Paradoxically enough, a majority of the individuals with elephantoid swellings are negative for microfilariae, and will consequently have to be omitted from the schedule. Omission of the latter category of persons is not in the interest of public co-operation in the programme.

The course of drug administration under the programme has, therefore, to be given to all the individuals in the community—hence the name “Mass Therapy” was given to this part of the programme. The principle underlying the programme of mass drug administration is to reduce the reservoir of infection in the individuals who harbour microfilariae, with or without symptoms.

**THE ORGANISATION OF MASS DRUG ADMINISTRATION :**

A census of residents in the area was first prepared by a planned house-to-house visit. Mass treatment was carried out over a period of 5 successive days, the dosage schedule varying with the age group\*. This dosage was in accordance with the findings of the Orissa studies. The drug was to be given after food, and never, on an empty stomach. The drug administration was carried out by a number of drug distribution teams, each team covering a population of about 300 in one week. Forty-five such teams were to be organised so that the entire unit population was covered within 6 months. Details of the procedure adopted are given below :—

**CENSUS TAKING :**

As in any programme aiming at reaching every member of the community, it was essential to make a list of all the residents in the area at the outset. A good plan appeared to be to carry out the census in each selected locality of 300 residents, on the first day of the week, and commence drug administration in the area

\*Adult (above 18) are given a daily dose of 200 mgm ; adolescents (12-18 years) a dose of 150 mgm ; children between 6-12 a dose of 100 mg ; and children between 2-6 years 50 mg. per day. The drug is withheld from age groups below 2 years.



on the following day. The nominal roll contained details regarding street and door number of the house, and list of names of residents, their age, sex and remarks regarding illness, if any, pregnancy, etc. The Filaria Officer or the Research Officer scanned the list thus prepared and marked the dosage to be administered to each person, and scored out with red pencil the names of those to be exempted from the drug administration, viz., pregnant women, children below two years and debilitated and chronically ill persons.

#### THE DRUG TREATMENT :

The course of treatment as mentioned earlier extended over a period of 5 consecutive days. The drug distributing team which generally included a local resident whose presence helped in securing public co-operation, went from door to door and administered the tablets to residents. For ease of distribution 100 mgm. tablets, with a groove in the middle, were supplied. It was to be ensured that the drug was swallowed with water in the presence of the distributor and not handed over for use later. Handing over was, however, resorted to where they were satisfied about the drug being put to proper use. In all such cases the unit officer had to satisfy himself that the drug was actually consumed. Such verification was essential as otherwise, not only was there a chance of the drug being put to improper uses, but also the follow-up data and assessment would be misleading.

#### MOSQUITO CONTROL OPERATIONS :

The mosquito control operations envisaged both anti-adult and anti-larval measures.

##### ANTI-ADULT MEASURE :

This was restricted at the outset to urban areas only. Indoor residual spraying with Dieldrin at 50 mgm. per sq. ft. was recommended to be carried out thrice a year in all the rural areas at intervals of 10 to 12 weeks while in urban areas the residual spraying operations were restricted to a single round during the peak mosquito season.

##### ANTI-LARVAL MEASURE :

Larviciding operations were restricted only to urban areas. Similar work in rural areas is in progress on an experimental basis under the units at Nagpur and Chanda in Maharashtra State and Mandapetta Unit in Andhra Pradesh.

In the early stages of the programme, it was considered that application of oil, though effective for larval control, would be difficult from the point of view of procurement, storage, transportation and application. Fifty per cent water wettable BHC powder (6.5 per cent gamma) was, therefore, used as larvicide. The Surat and Patna units preferred to use oil.

## (c) ASSESSMENT OF THE RESULTS :

The assessment surveys were restricted to the special study and the comparison areas, regularly every year. The first follow-up survey was to commence during the identical month in which the initial survey was made one year after the completion of mass therapy.

**Staff pattern****I. AT THE MALARIA INSTITUTE OF INDIA :**

Expansion of the staff at the Malaria Institute of India was recognised as a necessary step for the execution of the programme for (a) guiding and co-ordinating the activities and (b) for training the medical and ancillary personnel for the programme.

In addition it was also proposed to open three regional centres at Ernakulam (Kerala), Nagpur (Maharashtra) and Allahabad (Uttar Pradesh) to maintain liaison with the States. However, only the centre at Ernakulam was started in August, 1955. This centre apart from co-ordinating the activities of the programme in the States of Kerala, Madras and Mysore, has been used for training the personnel for the programme. Considerable research has also been in progress at this branch of the Malaria Institute of India.

The regional centres at the other two places have not been started yet. The liaison with the States, however, is being maintained by frequent visits by officers who are at present headquartered at Delhi.

The following technical staff was sanctioned for the National Filaria Control Programme at the Malaria Institute of India :—

Deputy Director	...	1
Assistant Directors	...	4
(Medical	3)	
(Entomologist	1)	
Deputy Assistant Director (Assessment)	...	1
Deputy Assistant Director (Chemistry)	...	1
Assistant Entomologist	...	2
Research Officer	...	4
Technicians	...	4
Insect Collectors	...	9
Laboratory Attendants	...	9

**II. IN THE PARTICIPATING STATES :**

The staff recommended and operational costs of each survey and control unit to be established in the participating States are given in Appendix II. Two Medical Officers were provided in the plan per control unit (designated as the Filaria Officer and the Research Officer respectively) so as to ensure adequate man-power for



careful assessment so indispensable in a programme which was essentially a large scale experiment and to take care of the cases showing drug reactions in the programme of mass drug administration.

## Supplies

### SURVEY UNITS :

One microscope and a jeep were supplied to each survey unit as aid from Government of India/T.C.M. The State had to make arrangements for the other supplies needed (Appendix III).

### CONTROL UNITS :

A list of supplies to control units from Central/T.C.M. aid is given below :—

#### (i) *Newly established unit :*

Station Wagon	...	1
Jeep with trailer	...	1
Microscope	...	1
Hand compression sprayers	...	32
Stirrup Pumps	...	25
Insecticides	...	6 tons
B.H.C. 6.5 per cent gamma 50 per cent W.W.P.	...	5.5 tons
Larvicidal oil	...	30,000 gallons
Diethylcarbamazine (100 mg. tablets)	...	1.95 million

#### (ii) *Continuing Unit :*

Insecticides	...	12 tons
B.H.C. 6.5 per cent gamma 50 per cent W.W.P.	...	11.0 tons
Larvicidal oil	...	30,000 gallons

Twenty hand compression sprayers designed for larval control operations were included in the supplies from 1958-59. From the same year BHC as a larvicide was replaced by mosquito larvicidal oil.

The supplies of diethylcarbamazine were made on the assumption that 65 per cent adult doses would be adequate for the population (i.e. excluding the pregnant, the chronically ill and children below 2 years) that would need treatment. The estimates of insecticides, as well as of the staff pattern recommended per unit, were based on those of the National Malaria Control Programme on the assumption that the average surface area per house was 1,000 sq. ft. The average coverage per pump per day, was estimated at 40 houses for calculating the staff requirements for field operations.

The State Government was expected to make available to the control units some laboratory equipment and knapsack sprayers (Appendix IV).

**RECORDING OF DATA :**

Reporting was planned in such a manner as to obtain all possible information on the field observations to enable proper appraisal and to introduce any changes in the field practices and the reporting procedures wherever indicated. Since the original proformae have been revised in the light of experience, only the current proformae in use are given in Appendix V.

**ASSESSMENT :**

It has been a feature of the programme that the assessment has been concurrent at the Unit, State and Central levels. The results of the assessment are considered in Section III. In addition, the services of Drs. Willard H. Wright and Henry K. Beye were made available through the courtesy of the U.S.T.C.M. early in 1957. Their recommendations as well as those of the Consultant in Public Health Engineering, Mr. T.F. Mac Gowan, have been studied by the Committee. It has been noted that some of their recommendations have been implemented from time to time.

**ADMINISTRATION AND FINANCE :**

The Indo-U.S. operational agreement on the filaria control programme in India was signed in New Delhi on the 25th March, 1955. The Government of India, with the aid from the U.S.T.C.M., made available the requisite quantities of insecticides, drug, larvicides, spraying equipment, microscopes and transport; the State Governments were responsible for the operational cost and the execution of the programme in the field.

The programme was scheduled to commence during the financial year 1955-56. The breakdown of the annual expenditure on the project up to 1959-60 is presented in Table I. The aid from the U.S.T.C.M. for the programme was discontinued with effect from 1958-59.

**TABLE I**  
*Statement showing the year-wise Central and State expenditure under the N.F.C.P.*  
(Rs. in lakhs)

Year	T.C.M.	Government of India	State Expenditure
1955-56	14.48	0.83	4.75
1956-57	32.38	15.48	9.43
1957-58	64.38	43.09	16.45
1958-59	0.18	29.16	29.14
1959-60	0.61	31.09	32.08
Total	112.03	119.65	91.85

The State units were administered by the State Health Department and were directly under the control either of the Director of Health Services or of the Director of Public Health.



### III. Assessment of the National Filaria Control Programme (1955 to 1959)

The objectives of the programme, as already referred to, were :

- (a) to delimit the problem of filariasis in the country,
- (b) to conduct large scale field studies to evaluate the methods of control, and
- (c) to train the personnel required for the programme.

In analysing the progress of work under the programme and in evaluating the results achieved so far, it is proposed to approach the subject according to the objectives enumerated above. Based on the above objectives the activities of the Filaria Control Programme in the country resolve themselves to activities of (1) the survey units, (2) the control units and (3) training. In the analysis presented in this report, each of the activities is discussed under the following headings :

Administration  
Organisation and  
Technical Results.

#### Survey Units

##### ADMINISTRATION :

In none of the States were the objectives of the survey units completed within the specified period of two years. Despite this in Bihar, Madras and Orissa States, the survey units ceased to function after two years. The survey units in Andhra Pradesh, Kerala, Madhya Pradesh and Uttar Pradesh, are continuing to function to date as the surveys are not yet complete. In Bombay (erstwhile Saurashtra) the survey unit was converted into a control unit at the end of two years although the survey proper was not completed within the period.

##### ORGANISATION :

The staffing in all the survey units was as per recommendation in the Programme.

##### TECHNICAL RESULTS :

A total population of 24.6 million has been covered during the sample surveys carried out so far (31st December, 1960) under the programme. The surveys revealed a number of new filarial foci in areas where filariasis was not suspected to be prevalent. The findings have led to wider understanding of the extent of filarial endemicity in India. While Jaswant Singh and Raghavan (loc. cit) estimated that the problem was of about 25 million people, data now available show that about

64 million live in the filarial tracts exposed to the risk of contracting the infection. Results of surveys carried out in the participating States are presented State-wise in Table II and Map II.

TABLE II  
*Areas surveyed under National Filaria Control Programme.*

State	Districts	Infection rate	Disease rate	Endemicity rate
1	2	3	4	5
Andhra Pradesh	West Godavari	2.50	0.20	2.69
	Guntur	0.60	0.50	1.06
	Hyderabad	7.33	3.90	11.10
	Nizamabad	14.97	6.30	20.63
	Karimnagar	14.70	6.30	20.70
	East Godavari	11.72	4.36	15.10
*Bihar	Gaya	12.15	22.00	32.06
	Bhagalpur	13.89	24.95	28.87
	Darbhanga	9.44	7.14	13.19
	Ranchi	4.33	4.26	6.71
	Monghyr	6.80	11.20	16.60
	Patna	14.20	21.00	31.50
	Muzaffarpur	8.96	14.21	21.88
Bombay	Chanda	10.62	6.33	15.96
	Nagpur	7.38	1.21	8.10
	Surat	33.90	1.70	35.60
	Sorath & Halar	2.70	0.50	3.20
Kerala	Trivandrum	6.42	2.40	7.00
	Trichur	5.02	3.44	8.36
	Kozhikode	5.64	6.36	11.94
	Cannanore	13.32	9.04	22.12
	Quilon	2.16	3.30	5.27
	Kottayam	2.04	1.24	3.26
Madras	Chingleput	11.20	8.01	19.20
	Ramanathpuram	0.52	0.22	0.74
	Madurai	0.14	0.02	0.16
	Tiruchirapalli	1.67	1.09	2.76
	Kanya Kumari	3.00	2.23	5.23
	Tanjore	9.56	6.37	15.59
	Salem	2.20	0.30	2.50
	Tirunelvely	...	0.16	0.16
	Nilgiris	...	...	...
	Coimbatore	...	...	...
	North Arcot	9.63	6.20	15.60
	South Arcot	8.38	2.62	10.88
*Uttar Pradesh	Mirzapur	9.20	10.40	18.90
	Fatehpur	6.40	12.30	18.70
	Deoria	8.50	13.20	21.10
	Azamgarh	10.90	10.90	21.00
	Varanasi	10.80	10.10	20.30
	Gazipur	8.10	10.50	17.80
	Jaunpur	11.48	8.48	16.36



# FILARIA MAP OF INDIA 1958

Sikkim & Bhutan states are attached to India by special treaties.

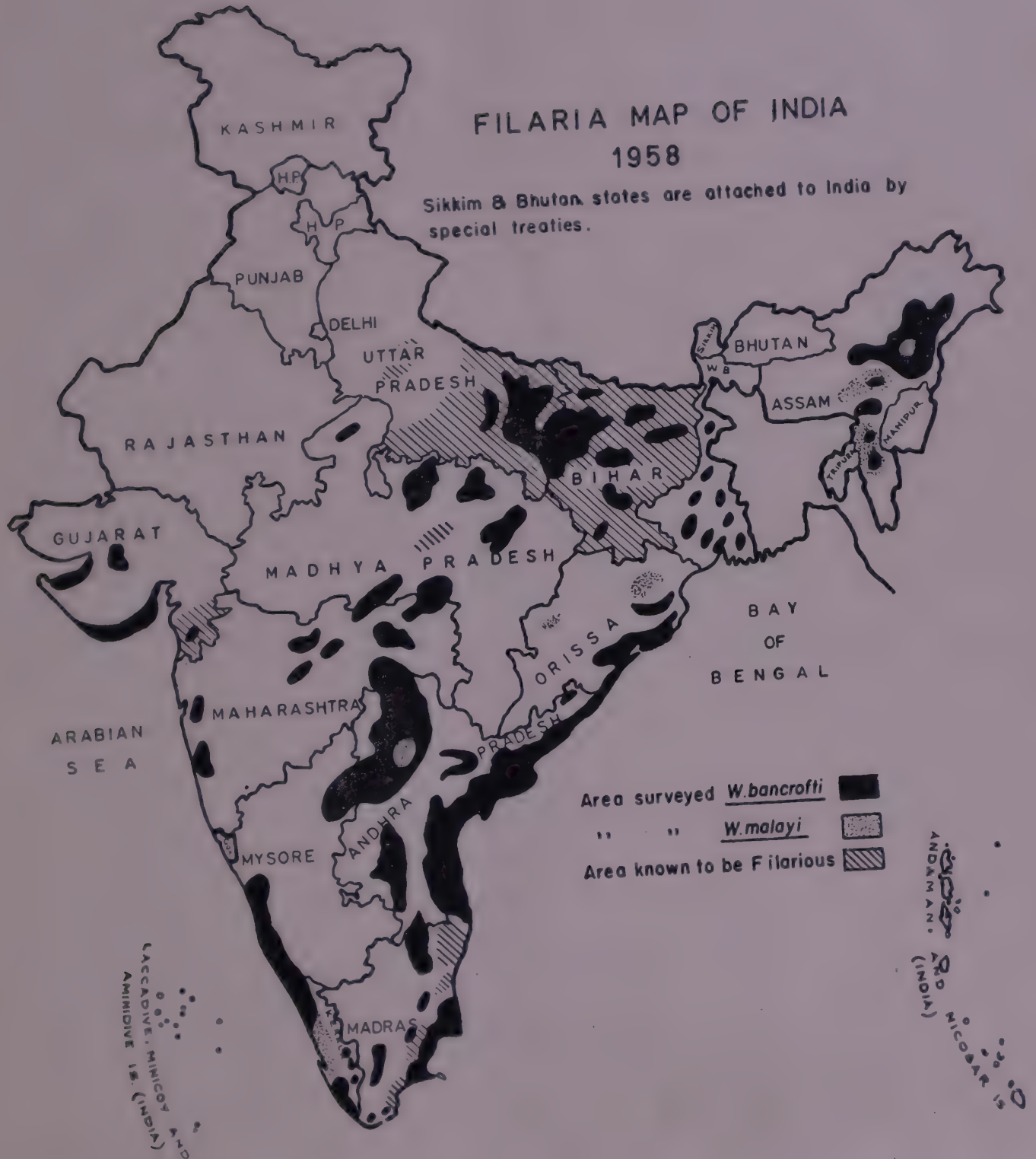






TABLE II—(Contd.)

1	2	3	4	5
*Uttar Pradesh (Contd.)	Faizabad	10.90	6.61	16.47
	Barabanki	8.60	1.96	10.49
	Basti	7.03	14.48	20.83
	Ballia	9.80	7.10	15.90
Madhya Pradesh	Panna & Satna	4.41	1.14	5.55
	Chattarpur	5.89	1.24	7.13
	Tikamgarh	1.11	0.29	1.40
	Shahdol	0.09	...	0.09
	Rewa	0.93	...	0.93
	Saugor	1.52	0.39	0.91
	Damoh	1.23	0.29	1.52
	Jabalpur	0.36	0.07	0.43
	Raipur	1.01	0.06	1.07
	Raigarh	0.007	0.02	0.027
	Durg	0.02	0.007	0.027
*Orissa	Chatrapur	5.90	5.60	11.50
	Khurda	4.51	5.00	8.96
	Puri	10.30	14.90	23.30

\*The disease manifestations for estimation of the disease rate were laid down as elephantiasis of the limbs and genital lesions. Attacks of fever, lymphangitis and lymphadenitis were to be excluded for this purpose. While most States have apparently followed the procedure as laid down, it would appear that units in Bihar, Orissa and Uttar Pradesh have included some of the acute manifestations in estimating the disease rate. The utility of computing a disease rate in large surveys is open to question.

### Control Units

#### ADMINISTRATION AND ORGANISATION :

The only two States in which the recommended supervisory staff was employed in most of the units during 1955 to 1959 were Bihar and Uttar Pradesh. It was noticed that a large number of units in the other States had remained understaffed, sometimes for very long periods. There have been number of instances where no Research Officer or Entomological Assistant was appointed at any time. There are a few instances where the Filaria Officer also was absent for varying periods. The position regarding the supervisory staff of the various units is shown in Table III.

The importance of having a full complement of staff cannot be over-emphasised. It has been brought to the notice of this Committee that the staffing has remained unsatisfactory in spite of the need for rectifying the position having been repeatedly stressed both by the visiting officers of the Malaria Institute of India and the Union Ministry of Health.

#### TECHNICAL RESULTS :

The activities assigned to the control units as referred to previously were :

(a) to conduct preliminary surveys in the selected areas,

**TABLE III**  
**Unit-wise Statement of vacant Supervisory posts\***

Designation of posts and number sanctioned			Filaria Officer	Research Officer	Assistant Entomologist	Inspector	Remarks
State	Unit	Year of allotment	1	1	1	2	
Andhra Pradesh	Kamareddy	1955-56	Vacant	Vacant	Vacant		
Assam		1957-58	Vacant		Vacant	Vacant(2)	
Bihar	Patna East	1955-56			Vacant*		*From Feb. 1959
	Ranchi	1956-57		Vacant*			*From Feb. 1959
Gujarat	*Surat	1955-56	Vacant	Vacant			*Municipal Unit. Antilarval operations began earlier than NFCP. A whole-time Mosquito Officer (non-medical biologist) of the State Health Department on deputation to the Municipality.
	Junagadh	1955-56		Vacant			
	Jamnagar	1956-57	Vacant	Vacant			
Kerala	Trivandrum	1955-56			Vacant		
	Kozhikode	1955-56	Vacant		Vacant		
	Quilon	1956-57			Vacant		
	Ernakulam	1956-57			Vacant		
	Alleppy	1957-58		Vacant			
	Thivur	1957-58		Vacant	Vacant		
	Cannanore	1957-58		Vacant			
Madhya Pradesh	Chattarpur	1955-56		Vacant	Vacant		
Madras	Chingleput	1956-57			Vacant*		*From April 1959
	Kumbakonam	1956-57	Vacant**	Vacant**	Vacant*		*From April 1959
	Vellore	1957-58		Vacant	Vacant*		**From May 1959
	Chidambaram	1957-58		Vacant	Vacant		*From April 1959
Maha-rashtra	Nagpur (rural)	1955-56	Vacant*		Vacant		
	Chanda	1957-58		Vacant	Vacant		
	Surat-Thana	1957-58		Vacant	Vacant		*From Aug. 1958
Orissa	Khurda	1955-56		Vacant*	Vacant		*From June 1958
	Cuttack	1956-57		Vacant**	Vacant*		*From Aug. 1958
	Rangpur	1956-57		Vacant*	Vacant		**From Oct. 1958
	Chatrapur	1956-57		Vacant	Vacant		*From May 1958
	Puri	1956-57		Vacant*	Vacant		
Uttar Pradesh	Basti	1956-57		Vacant*			*From April 1958
							*From April 1959

\*Ramakrishnan et al. (1960) *Ind. J. Mal.* 14, (in press)



- (b) To undertake control operations :
  - (i) drug administration
  - (ii) mosquito control procedures, and
- (c) To make an assessment of the technical data collected.

The analysis of the results described below is presented under the headings mentioned above.

#### PRELIMINARY SURVEYS :

The preliminary surveys were meant to collect the baseline epidemiological data for later assessment of results of control. These surveys were confined to the special study and comparison areas, and covered 10-15 per cent of the population in those areas. Continued observation in the comparison area had to be stopped because the people protested to the examination in the absence of control measures that were being carried out in the control area.

#### PROGRESS OF MASS DRUG ADMINISTRATION :

Mass treatment with Diethylcarbamazine has been carried out in one or more units in all the participating States. Up to December, 1960, 56.20 lakh persons out of 141 lakhs under the 47 units have taken the drug for one or more days. The proportion which took the full 5 days course, ranged with different units between 38.30 to 97.60 per cent of those who received the drug. The unit-wise analysis of the data is given in Table IV.

#### DURATION OF MASS THERAPY :

It was observed that units in which the full complement of recommended staff was appointed, completed the mass therapy within the targetted time of 6 months and some of them in 4 months. All these units are either purely urban, like Surat, Mangalore, Ernakulam, Trivandrum and Patna or have a major urban complement like most units in Bihar.

The Uttar Pradesh units, the Nagpur rural unit, the Chattarpur (Madhya Pradesh) unit and the Mandapetta (Andhra Pradesh) unit all of which cover mainly rural and semi-urban areas, were able to complete the programme in 7 to 10 months. The targetted population scheduled to be protected under the Mandapetta unit, however, is higher, i.e. 3.5 lakhs instead of 3 lakhs. The Khurda unit (Orissa) having a similar distribution of the areas took 15 months for the completion of the programme, while the units at Cuttack (Orissa) and Kumbakonam (Madras) took 13 and 18 months respectively.

The percentage of the targetted population completing the treatment in the different units did not show any correlation with the time taken for completion of the programme. The highest coverage was recorded to have been obtained in those units which completed the mass therapy in 7-8 months. The Mandapetta unit obtained a coverage of 60.6 per cent in 10 months, while in spite of having

taken much longer periods the Cuttack and Khurda units were able to cover only 41.4 and 32.1 per cent respectively.

TABLE IV

*The percentage of persons treated for different numbers of days (1-5 days) during mass drug administration.*

State	Unit	No. of persons treated	Percentage of persons treated for days				
			1	2	3	4	5
Kerala	Ernakulam	1,17,112	9.1	5.8	5.7	11.3	68.1
	Trivandrum	1,91,621	7.6	6.1	6.3	9.5	70.5
	Quilon	67,479	2.4	2.9	2.3	3.3	89.1
Bombay	Nagpur (rural)	1,59,903	14.1	14.0	15.3	18.3	38.3
	Porbandar	31,516	9.3	6.0	4.4	6.1	74.2
	Surat	73,245	15.6	12.6	13.0	19.0	39.0
Madhya Pradesh	Chattarpur	2,37,683	2.8	1.8	1.9	2.3	91.2
Mysore	Mangalore	80,967	3.4	2.4	3.0	6.0	85.1
Madras	Kumbakonam	2,36,670	7.6	6.8	11.8	19.6	54.2
Bihar	Monghyr	2,04,803	6.2	6.0	7.8	5.3	74.7
	Patna West	1,26,078	3.0	1.9	1.9	4.5	88.7
	Bhagalpur	1,86,062	1.4	1.2	1.5	2.1	93.8
	Gaya	2,19,872	2.3	2.3	3.4	5.0	87.0
	Ranchi	1,27,270	7.7	8.8	11.3	17.2	55.0
	Muzaffarpur	2,00,804	2.6	2.9	3.1	4.6	86.8
	Darbhanga	1,94,938	14.7	13.7	13.5	17.3	40.8
Orissa	Cuttack	1,17,054	2.6	3.0	2.8	3.8	87.8
	Ranpur	1,25,258	2.1	2.0	3.0	6.5	86.4
	Khurda	97,705	5.0	5.6	9.2	16.3	63.9
	Puri	70,339	10.6	10.6	12.5	15.4	50.9
	Chatrapur	95,271	8.4	9.6	13.1	16.3	52.6
Uttar Pradesh	Basti	2,82,979	0.4	0.4	0.6	1.0	97.6
	Faizabad	1,99,153	1.3	1.6	2.3	2.7	92.1
	Ballia	1,90,267	1.4	1.5	2.3	6.1	88.7
24 Units (Approximately 70 lakhs)		36,33,969	5.3	4.9	5.9	8.4	75.5

### Reaction to drug treatment.

Many unpleasant reactions have been observed following the administration of the drug. Varying number of cases show reactions within about 24 to 48 hours of taking the drug. The death of the microfilariae in the system is believed to be one of the factors responsible for such reactions which range from slight indisposition, headache and feverish feeling to prostration and high fever. Occasionally



cases of severe body pains, abdominal cramps, gastro-intestinal upset accompanied by choleraic symptoms have also been reported. The incidence of the different types of reactions and their incidence in relation to the day of drugging are given in Tables V and VI.

TABLE V

*The types of reactions occurring among the people who took the drug were analysed as follows by Patel and Paranjpey\* (1958).*

	Drug taken on full stomach	Drug taken on empty stomach
Number of persons observed	123	109
Number who complained of reactions	29 (23.5%)	25 (23%)
Symptoms complained of :—		
Fever	25	14
Headache	8	2
Body pains	8	3
Diarrohoea	2	2
Constipation	1	6
Vomiting	0	5
Abdominal pain	11	4

\*T.B. PATEL AND P.D. PARANJPEY (1958)...*Ind. Jour. Mal.*, **12**, 3, Sept., 1958—Observations on mass therapy with diethylcarbamazine (Hetrazan) for Filaria Control in Bombay State.

TABLE VI

*Percentage of treated individual who developed reactions during Mass Drug Administration under the National Filaria Control Programme.  
(Unit-wise analysis)†*

State	Unit	No. of persons treated	Percentage of persons showing reaction on					Total per cent of persons showing reaction
			1st day	2nd day	3rd day	4th day	5th day	
Uttar Pradesh	Barabanki	2,27,492	17.0	21.8	24.4	21.4	15.4	10.2
	Basti	2,82,979	0.005	25.1	32.0	25.1	17.8	..
	Faizabad	1,99,153	20.7	25.6	24.6	18.3	10.7	28.8
	Ballia	1,90,267	3.4	27.3	31.6	24.5	13.2	16.8
	Gorakhpur	1,68,976	6.8	21.3	27.7	25.7	19.0	23.8
	Varanasi	1,93,491	7.6	29.5	31.1	23.3	8.5	10.3

† RAMAKRISHNAN, S.P. *et al* (1960)...*Ind. Jour. Mal.* **14**, 4, December.

TABLE VI (Contd.)

State	Unit	No. of persons treated	Percentage of persons showing reaction on					Total per cent of persons showing reaction
			1st day	2nd day	3rd day	4th day	5th day	
Bihar	Monghyr	2,04,803	16.0	36.5	26.7	19.6	1.2	10.6
	Patna West	1,26,078	2.5	27.3	30.5	24.9	14.8	15.3
	Bhagalpur	1,86,062	..	27.0	29.4	24.4	19.2	34.7
	Darbhanga	1,94,938	9.2	22.2	25.9	23.6	19.1	9.5
	Gaya	2,19,872	0.9	36.6	29.9	21.2	11.4	9.6
	Ranchi	1,27,270	..	30.2	36.9	21.5	11.4	4.4
	Muzaffarpur	2,00,804	81.5	15.8	2.5	0.2	..	4.1
Kerala	Ernakulam	1,17,112	27.6	31.4	25.0	15.1	0.9	22.7
	Trivandrum	1,91,621	4.8	34.0	29.7	24.9	16.6	17.5
Bombay	Nagpur	1,59,903	7.3	25.1	26.3	23.3	18.0	37.4
	Porbandar	31,516	3.0	21.0	32.0	24.4	19.5	13.6
	Surat	73,245	0.8	25.8	29.4	24.3	19.7	23.9
Madhya Pradesh	Chhattarpur	2,37,683	7.8	32.4	29.5	18.4	11.9	7.3
Mysore	Mangalore	80,967	3.3	33.9	30.6	21.6	10.6	17.0
Madras	Kumbakonam	2,36,670	2.1	28.5	30.4	24.3	14.7	25.4
21 Units		36,50,902	8.5	26.7	27.9	23.0	13.9	16.5

The drug has a powerful action on intestinal round worms ; while this may be beneficial in many cases, rare instances are known of intestinal obstruction necessitating hospitalisation, particularly where the round worm infestation was heavy.

#### Public co-operation for mass treatment.

Experience has shown that a lot of preliminary education is essential regarding the scope and objective of the mass drug administration. The unpleasant reactions, though transitory in the majority of cases, sometimes take a severe course. This has frequently led to certain adverse propaganda, the gullibility of the lay public has been exploited by mischievous rumours like "the programme is for family planning" and "these are birth control tablets". Deaths occurring in the area during the course of the programme of drug administration, be it due to co-existing infectious diseases or other causes, are sometime glibly attributed to the drug.

The individuals who are the reservoirs of the infections are often free from any manifestations and are apparently healthy. It is this group of persons which obviously has to be given the course of treatment as the sole object of the mass treatment programme is to reduce the reservoir of infection in the community. Occurrence of reactions (Appendix VI) in these persons often led to public non-co-operation.



## Mosquito control operations :

### ANTI-ADULT MEASURES :

As shown later in this chapter the use of Dieldrin failed to give satisfactory results in interrupting transmission and trials were carried out with formulations of BHC (high gamma content). Since these also were found to be unsatisfactory, use of all insecticides has been discontinued under the programme.

### ANTI-LARVAL MEASURES :

Larval control operations have been recognised as an essential part of the control of *Culex fatigans* under the programme, particularly in urban areas. While larviciding operations have been in progress in a number of urban areas, similar work in rural areas is in progress under the units at Nagpur District and Chanda in Maharashtra State and Mandapetta Unit in Andhra Pradesh.

Those units which have been using B.H.C. as a larvicide on a large scale complained about the lack of control with the formulation ; this was particularly so in the presence of highly polluted water which favoured breeding of *Culex fatigans*. The demand for oil was pressed for by many units and in some, they started using small supplies of oil obtained from local resources in preference to the supply of B.H.C. made available under the programme. The need for substituting B.H.C. with a more effective larvicide was considered in 1957-58 and larvicidal oil is now being supplied under the programme since 1958-59.

### ASSESSMENT OF RESULTS :

An evaluation of the epidemiological and entomological observations, recorded by the units are discussed below :

### EPIDEMIOLOGICAL ASSESSMENT :

The annual assessment surveys as per plan were restricted to the special study and the comparison areas. The first follow-up survey was to commence during the identical month in which the initial survey was made, one year after the completion of mass therapy.

The mass drug administration produced varying degrees of reduction in the microfilaria rate as well as the mean microfilarial density in the community. Though there are a few exceptions, there appears to be a general direct correlation between the percentages of population treated and the reduction in the microfilaria rate in the different units. The decline in the mean microfilarial density in the community does not show any such correlation. The reduction in the mean mf. density at the end of one year following drug administration ranged from 10.9 to 84.6 per cent. The data regarding those units which recorded a decline of more than 50 per cent in the density are shown in Table VII,

TABLE VII

*Data in respect of units which showed more than 50 per cent reduction of microfilarial count after therapy.*

Unit	Percentage of population covered	Per cent reduction in the mean mf. count.
Khurda ... ..	32.1	64.6
Ballia ... ..	69.4	72.1
Muzaffarpur ... ..	76.3	84.6

It is observed that in some units which have reported a high coverage of population during the mass drug administration the effect is not proportionately reflected in the follow-up surveys as detailed below in Table VIII.

TABLE VIII

*Percentage of population covered under mass therapy and change in mean microfilarial density.*

Unit	Percentage of population covered	Percentage change in mean mf. density.
Nagpur (rural)	56.4	Increase more than 10 times
Darbhanga	63.8	Increase 3.9
Faizabad	66.4	Decrease 10.9
Gaya	67.9	Increase 23.0
Monghyr	73.4	Decrease 39.0
Barabanki	82.6	Decrease 49.9
Chatrapur (Orissa)	99.5	Increase 35.3

The purpose of the mass drug administration was to bring about a reduction in the microfilaria load in the community with a view to reducing the reservoir of the infection. While the low degree of reduction in some of the units is disturbing from this point of view the positive increase, which is very marked in some of the units is disconcerting. This would appear to be attributable to sampling errors. Besides, it has to be ensured that the drug was actually swallowed by the proportion of population reported to have been under treatment. Enquiries have revealed that a certain percentage of the tablets were handed over to be consumed later in the day, after meals. Details, however, are not available, nor has there been any record of later verification that the drug so handed over had been actually consumed.



The following data were collected for evaluation of the vector control operations :

- (i) Vector density.
- (ii) 24 hours survival rates of *C. fatigans*.
- (iii) Infection and infectivity rates in *C. fatigans*.

#### VECTOR DENSITIES AND SURVIVAL RATES :

An analysis of the data on the density of *C. fatigans* and the survival rates following spray operations shows (vide Table IX) that there has been no appreciable reduction in the vector density even during the week immediately following the application of the spray. Except in one unit (Bhagalpur) where the reduction in density has been maintained at more than 50 per cent during the observation period of 4 weeks, the fall in vector density has varied between 4 and 33 per cent during the first week in some units while in others there has been actually a rise in density.

The survival rates have also been high among mosquitoes captured from sprayed stations and kept in the laboratory for 24 hours, except in Bhagalpur unit where 100 per cent mortality was recorded during the first week, followed by 23.9, 55.6 and 57.9 per cent during the following weeks. Very low mortality has been recorded even during the first week following spraying in the other units. The data from some units are tabulated in Table IX.

The data would indicate :

- (a) that even without any reference to the vectors being resistant\* to the insecticide, the duration of residual toxicity is only of the order of about 4 weeks. Even organophosphorus† insecticides do not exert residual toxicity for more than 8 weeks.
- (b) that the chlorinated hydrocarbons that have been tried viz., DDT, Dieldrin and BHC (high gamma) have precipitated resistance in *C. fatigans* as indicated by the high survival rates. The point to be considered in this context is that filaria transmission in most of the places takes place for the greater part of the year. Therefore any interception of the vector by adulticidal measures would require to be applied frequently at least about 6 to 7 times a year. Apart from the impracticability of such frequent indoor spraying operations and the economic aspects, this procedure will surely precipitate insect resistance due to the high selection pressure. The public are also not likely to accept such frequent house sprayings. In view of this, for the present adulticidal operations have been discontinued in the programme since 1959-60.

\* SHARMA, M.I.D. (1958)...*Ind. Jour. Mal.*, **12**, 401-412.

† RAMAKRISHNAN, S.P., SHARMA, M.I.D., and KALRA, R.L. (1960)...*Ind. Jour. Mal.*, **14**, 545-566.

TABLE IX

Weekly vector densities and 24 hours survival rates in sprayed stations following application of Dieldrin at 50 mg./sq. ft.

Unit	Insecticide used	Week following application of spray (in per cent.)										Remarks
		1st week		2nd week		3rd week		4th week		Survival	Survival	
		*Variation in density	Survival	*Variation in density	Survival	*Variation in density	Survival	*Variation in density	Survival			
Jamnagar	Dieldrin	- 4	70	+135	64	- 14	67	+ 50	17			
Muzaffarpur†	-do-	- 4	84.5	- 4	84.4	- 4	84.9	- 4	85.7			
Bhagalpur†	-do-	-80	0	- 71	23.9	- 59	55.6	- 53	57.9			
Mangalore†	-do-	-19	86.7	+ 13.6	..	+ 92	..	- 14	100.0			
Katol	{ -do- }	+14	35.7	..	..	..	66.7	..	75.0	Observations in five villages.		
		+14	60.6	- 41.3	43.3	..	52.7	..	65.0			
		+39	58.7	100	87.8	- 6.0	50.0	..	62.0			
		+73	65.3	- 27	56.0	..	40.0	..	60.0			
		-26	27.7	- 48.4	78.3	- 42.8	65.0	..	70.0			
Surat B.M.†	{ -do- 1958 -do- 1959 }	..	66	+ 6	63	+ 15.6	63	- 90	65			
Nagpur Corporation†	-do-	-33	..	- 45	..	- 61	..	..	..			
		+62.5 0	.. ..	-136.5 +118	.. ..	+107.5 ..	.. ..	+475 ..	.. ..			

\* The variations in density are in comparison to the density prior to control.

† Year-round larval control operations.



The results of mosquito dissections are presented in Appendix VII. Comparable data for more than one year are available from seven units. The total infection rate as well as the infectivity rate have been separately analysed and presented.

#### INDICES OF MOSQUITO TRANSMISSION :

The infection and infectivity rates have shown varying changes in the different units during the period of observations. The total infection rate has shown a general fall in some units (Surat, Katol and Muzaffarpur). A marked decline is noticeable in the Muzaffarpur unit during 1958-59 as compared to the corresponding months of the previous year. A similar fall in the index is recorded by the Nagpur (rural) unit during 1957-58 compared to the period 1956-57. The records for 1958-59, appear to indicate that this fall is in general being maintained in the unit area. Similarly, a sharp fall is noticed in the Surat unit during 1957-58 compared to the previous year, and the fall was maintained during the subsequent year.

Little variation of infectivity rates is noticed either in the Muzaffarpur or Nagpur units. While during some months there has been no significant difference, during others a rise in infectivity rate has been recorded—this is comparatively more marked in the Nagpur unit. The observations recorded by the Surat unit show a rise during the months January to April, but a reduction in transmission is noticeable during the remaining part of the year.

A general rise in the total infection as well as the infectivity rates has been recorded by the units at Patna, Gaya and Kozhikode. The mosquito transmission appears to be of a low degree in the area under the Ballia unit and the slight increase or decrease recorded in the mosquito transmission indices would not justify any conclusion at this stage.

From the available data, those of Surat and Mangrol (Gujarat) have been separately analysed in order to show the results of continued anti-larval operations. These units have been selected because, the reports available as well as inspections showed that the anti-larval operations were carried out to the extent possible under the prevailing circumstances. Table X shows the data with regard to mosquito density, infection and infectivity rates in the vector mosquitoes for the years 1956 to 1959.

From Table X it would be seen that the vector density has shown a decrease in both the areas up to 1959. The infection rates also decreased during the same period. The infectivity rates, also have decreased. While it is true that mass treatment with Diethylcarbamazine was also carried out the percentage of the targetted population to whom the drug was given was 43.7, and 56.0 per cent respectively. It has also been referred to earlier that the infection and infectivity rates in mosquitoes were not strikingly affected by the mass treatment programme alone where carried out. Therefore, the reduction in infectivity rates, in the above areas can be considered mainly due to the anti-larval measures.

TABLE X

*Density of Culex fatigans filarial infection and infectivity in areas where antilarval operation have been carried out.*

Unit Area	Particulars	1956	1957	1958	1959
Surat (Burrough Municipality)	Density P.M.H.	81.5	64.2	81.84	51.7
	Infection Rate in Mosquitoes	23.3	9.7	8.89	5.52
	Infectivity Rate in Mosquitoes	1.6	2.6	1.28	0.85
Mongrol (Junagadh Unit)	Density P.M.H.	..	48.7	34.1	20.45
	Infection Rate in Mosquitoes	..	2.85	4.45	1.04
	Infectivity Rate in Mosquitoes	..	1.21	0.13	0.11

#### TRAINING :

As mentioned earlier, the training centre for the Filaria Programme was established at Ernakulam in 1955. Since then 77 Medical Officers and 195 Filaria Inspectors have been trained in 5 and 7 courses respectively. Table XI shows the duration of the course and a State-wise breakdown of the number of the two categories trained :

TABLE XI

*Breakdown of training.*

States/Organisation	Number trained at Filariasis Training Centre, Ernakulam, Malaria Institute of India	
	Medical Officers Course*	Inspectors course for 4 weeks
1. Andhra	10	10
2. Bihar	6	8
3. Bombay†	9	42

\* Of 6 weeks duration for the 1st three courses up to 1957 and 8 weeks duration thereafter.

† Figures shown include the number of trainees from Gujarat and Maharashtra as of the original Bombay State.

In addition six Medical Officers Entomologists from Burma, Ceylon, Indonesia, New Guinea and Thailand, (on WHO Fellowship) were trained for varying periods at this Centre.



TABLE XI (Contd.)

State/Organisation			Number trained and Filariasis Training Centre, Ernakulam, Malaria Institute of India	
			Medical Officers Course*	Inspectors course for 4 weeks
4. Islands	...	...	1	4
5. Kerala	...	...	7	34
6. Madhya Pradesh	...	...	4	5
7. Madras	...	...	8	25
8. Mysore	...	...	1	6
9. Orissa	...	...	9	10
10. Uttar Pradesh	...	...	17	26
11. Armed Forces Medical Services	...	...	5	21
12. Coalfields	...	...	..	1
13. Railways	...	...	..	3
Total		...	77	195

\* Of 6 weeks duration for the 1st three courses up to 1957 and 8 weeks duration thereafter.

#### IV. Research in Filariasis.

The present position of the filariasis problem in India and its control has been set out in the earlier chapters. There are many lacunae in the different fields which have been brought out. Naturally these aspects deserve to be studied in detail and need to be started at an early date. A list of the major aspects needing such a study is set below. It is suggested that the existing facilities of National Filaria Control Programme Organisation of the Malaria Institute of India, suitably augmented, take up these projects in liaison with the filaria control units and the Research-cum-Training Units proposed and the State Health Organisation Filariasis Sections. Such collaboration that is possible with national and International agencies would be desirable.

The major problems of research needing early attention are :

##### 1. RESEARCH IN EPIDEMIOLOGY OF THE DISEASE :

A broad outline of the problem as it exists today, has been described. It is essential to carry out field surveys in order to delimit the areas of filariasis in the country and prepare a filariasis map of India. These studies will indicate where attention has to be concentrated in the first instance in the adoption of the control measures against the disease and where extension of work on the lines of the present programme will have to be undertaken. The point for consideration is whether areas showing low microfilaria rates in the population but an appreciable amount of infection in mosquitoes should receive high priority in any programme for the control of this disease. Present experience has shown that the control programme is likely to be of long duration. While attempts are made, therefore, to deal with the existing areas of high endemicity, it would be necessary to see that extension of the infection to other areas, which will ultimately be an additional burden on our resources, is avoided. Control measures in areas where infection is not yet fully developed might prove more economical in the long run than in areas of high endemicity. It is from these aspects the field surveys to define areas of filariasis seem to be important.

In the study of epidemiology of this disease, two basic factors have to be kept in mind, namely, the probably long incubation period of the disease and the need for repeated infection before the disease gets finally a foothold. It was shown during the Second World War that soldiers infected in one region lost their infection when transported to areas free from filariasis. A problem of some importance in this connection is to determine whether filariasis is a household or familial infection. Work done earlier has suggested that this is a possibility. The insect vector, *Culex fatigans*, which breeds in cesspools around houses, does not seem to travel too far but remains confined, so far as its feeding habits are concerned, to houses in very



close proximity to the breeding areas. If these observations are finally confirmed, they would provide some indications on where to adopt anti-larval measures for dealing with them with ease and economy.

This type of epidemiological work, as envisaged above, should be entrusted to the Research-cum-Training Unit recommended to be established in the Third Five-Year Plan period.

## 2. FACTORS RELATED TO TRANSMISSION-ENTOMOLOGICAL RESEARCH :

From what has been said above, it would be clear that there are many other aspects which need investigation, e.g. those which favour or retard the transmission of infection from mosquitoes to human population. It is well known that bancroftian filariasis is endemic in many parts of the country with varying climatic conditions like rainfall, temperature, humidity, etc. However, there is reason to believe that the spread of infection in any area occurs slowly. It is possible, that in some areas the transmission is perennial while in others it is seasonal. If such difference exists, there must be differences in the quantum of transmission which will eventually influence the incidence of infection as well as that of the disease in a population.

In view of these considerations the subjects of study could be defined as follows :—

- (a) the areas of the reservoir of infection ;
- (b) vector density ;
- (c) vector longevity ;
- (d) gonadotrophic cycle and the biting rate ; and
- (e) the influence, if any, of the immune status of the host on the developmental cycle of the parasite in the mosquitoes.

Research carried out on the above aspects will provide basis for working out a 'transmission index' which is still lacking and which is essential in order to elucidate the evolution of endemicity as well as for the precise evaluation of results of control. This could be worked out by the Malaria Institute of India as well as by the Research-Cum-Training Units.

## 3. IMMUNOLOGY OF FILARIASIS :

Many factors concerning the specific immunity to infection and disease, either inherent or acquired, have yet to be studied. It has been observed that once the disease has established itself, there is a progressive decrease in the number of microfilariae per cubic millimeter of blood. In a majority of cases microfilariae totally disappear. Whether this phenomenon is attributable to immunity or to the physical death of the adult worm is debatable. It is also known that in cases of established elephantiasis further exposures to infections are of no avail. Pandit

*et al.* (1929)\* demonstrated an immunity phenomenon, called the 'adhesion phenomenon', in filariasis. In the presence of serum from a case of elephantiasis, leucocytes adhere to microfilariae, bringing about their death. The presence of an antibody in the serum of a case of elephantiasis could thus be demonstrated. It seems worthwhile to pursue this work on a quantitative basis using refined procedures which are now available for the purpose.

Again in the early stages of infection and disease, microfilariae may not be demonstrable by routine microscopy. In such cases the role of antigens prepared from filarial worms, and the elucidation of cutaneous reaction with their use, should be explored. It may be pointed out that so far antigens have been prepared from infective larvae of specific infections harvested from infected mosquitoes. The specificity of the reaction can then be demonstrated more readily by this technique than would be possible otherwise. In dealing with the problem of transmission reference was made to the immune status of the host in determining the infectivity of the vector. This is also an associated phenomenon in immunity which needs study.

#### 4. CLINICAL STUDIES :

Filariasis, like syphilis and malaria, appears to be protean in its manifestations. Apart from lymphadenitis and lymphangitis, other symptoms of the disease do not receive much attention in the differential diagnosis of any other conditions. Experienced clinicians and surgeons have often noted a large number of clinical conditions which may be simulated by filariasis. Instances of acute abdomen amenable to specific filarial therapy are known. However, such cases have not been properly documented or studied. One of the methods to build up specific and classified knowledge on this subject would be to submit every case of ill-health in endemic areas, to the examination of night blood smear. When microfilariae are thus demonstrated in any case that finding should receive consideration in the differential diagnosis of the clinical condition under investigation. Such a procedure may also yield valuable results in the study of allergic conditions which are manifestly of diverse etiology. In discussing the immunology of the disease, reference has been made to the studies of filarial antigens. Apart from their utility in the early diagnosis of filariasis, they would also bring to light the filarial etiology of such conditions as tropical eosinophilia. Apparently there is some evidence that at least a proportion of cases of tropical eosinophilia is caused by filarial infections. It would be worthwhile to compare the antigens, prepared from infective larvae of different animal filarial infections, in the elucidation of some aspects of tropical eosinophilia. Preliminary work, carried out at the Malaria Institute of India, indicates the possibility of the use of haemagglutination test for such diagnostic purposes.

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\* PANDIT, C.G. *et al* (1929)...*Ind. Jour. Med. Res.*, 16, 946.



## 5. THERAPEUTIC TRIALS :

In the mass therapy programme instituted with diethylcarbamazine (hetrazan), certain interesting results have come to light. The occurrence of reactions, either mild or severe, has been noted. Severity of the reactions apparently depends on the degree of infection in an individual, as well as the extent to which disease process has been established. The occurrence of such reactions has been a great hindrance in the successful execution of mass therapy for the control of the disease. The varying factors, which precipitate such reactions, have to be studied from all aspects, i.e. biochemical, as well as immunological. Again, it is necessary to determine an adequate or optimum single dose therapy in such cases, which might be a more feasible proposition for adoption in mass therapy than the current five day treatment in use in the programme.

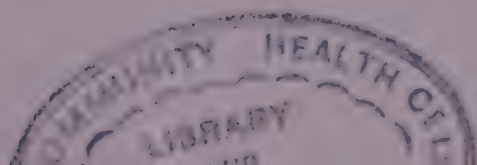
The possibility of inducing immunity in individuals with the use of specific antigens prepared from infective larvae from mosquitoes should also be investigated. If it can be shown that antibodies against infective larvae do develop it would be a contribution of immense value from the standpoint of prophylaxis.

## 6. ANIMAL FILARIASIS :

Research in the problem of filariasis in general cannot be considered comprehensive unless attention is also paid to the problem of animal filariasis. Many animals show filarial infections with different types of filarial worms. In so far as is known, no evidence exists of a zoonotic relationship of *B. malayi* to any animal infection in India, as has been demonstrated in Malaya. *W. bancrofti* does not appear to have any zoonotic background. Many of these animal filarial infections, as has been stated above, may play a role in the etiology of tropical eosinophilia the incidence of which in this country is said to be the largest in the world. Again, the morphological and developmental forms of different filariae in the mosquito, as has been shown by King, *et al* (1929)\* may provide the basis for a proper evaluation of epidemiological results and the role of mosquitoes in transferring the infection.

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\* KING, H.H. *et al* (1929-1930). *Ind. Jour. Med. Res.* 17, 406.



## V. Lessons of the National Filaria Control Programme (N.F.C.P.) and recommendations :

### LESSONS OF THE N.F.C.P.

The following salient points are brought out by a study of the activities of the National Filaria Control Programme and the discussions held by the Committee with the project staff at various levels.

- A. (i) that the filariasis problem in the country is far greater than envisaged previously,
- (ii) that bancroftian filariasis spreads centrifugally from urban to rural areas,
- (iii) that with the existing conditions of drainage and water supply, expansion of existing urban areas and populations migrating, there is a large risk of filarial transmission being established in new areas,
- (iv) that no area, therefore, can be considered free from the risk of transmission before a study is made on the spot.
- B. (i) that none of the synthetic imagocides so far available is capable of significantly intercepting filariasis transmission,
- (ii) that mass drug administration with Diethylcarbamazine has limitations and is of restricted value in a control programme in the country, and
- (iii) that anti-larval measures wherever adequately adopted have proved useful.
- C. (i) that in view of the fact that a time limited crash programme is not applicable to filariasis control, the organisation for it has to be gradually and permanently built on the existing public health set up.
- (ii) that the measures once established will have to be maintained continuously ;
- (iii) that disease is no respecter of any boundary local body, State or even country. Therefore, whatever organisation is decided upon for the control of filariasis, it has necessarily to be a State-wide organization with the administrative and technical responsibility resting with the State Health Department.
- (iv) that medical officers are not available in sufficient numbers. And when available, are not generally interested in the type of work that filarial control envisages. Therefore, it would seem desirable that non-medical biologists be suitably trained and specifically appointed for this purpose. In Surat Municipality this approach has yielded very good results.



These anti-mosquito officers, in order to function efficiently should be members of the State Health Cadre and on no account should they be direct employees of the local body service. Such an approach may make it possible for one such officer to be responsible for 75 to 100 thousand population. He should, of course have the necessary training in the methodology of mosquito control operations and provided with ancillary staff.

#### THE PROBLEM :

According to the present surveys, over 64 million people seem to be living in areas where filariasis transmission is taking place in some degree or the other. It would also seem that the spread of filariasis is centrifugal from urban to rural areas\* vide Table XII. New colonisations, industrialisation as well as the expansion of the existing urban areas are all contributing to an increase of the problem.

TABLE XII

*The Centrifugal spread of Bancroftian filariasis from an urban area.*

Name of town/ village.	Distance in miles from Bhagalpur city.	No. of persons examined.	Microfilaria rate (Per cent)
Srirampur	2.50	204	17.60
Ramchak	4.00	348	14.08
Makandpur	6.50	197	10.10
Khutiba	7.00	111	9.69
Kheria	7.50	75	5.30

#### LIMITATIONS OF INSECTICIDES :

From the available results of insecticidal application on the vector densities, it is apparent that the residual effect lasted during first one or two weeks only following spraying. The mosquito density often remained unaffected even during the week following the application of spray (Table IX). Investigations show that the vector has become resistant to DDT, dieldrin and gamma BHC† in many parts of the country. It is, therefore, evident that the control of filariasis by residual spraying of houses with the available insecticides is not possible. The only other adulticidal measure worth exploring for the interception of transmission is

\*VARMA, B.K., DASS, N.L. and SINHA V.P. (1961)...*Ind. Jour. Mal.* **15**, 185-96.

†PAL R., SHARMA, M.I.D., and KRISHNA MURTHY, B.S. (1952)...*Ind. Jour. Mal.* **6**, 306-26.

RAJGOPALAN, N., VEDAMANICKAM, J.C., and RAMOO, H. (1956)...*Bull. Nat. Soc. India. Mal. Mosq. Dis.* **4**, 126-28.

space spraying of houses with pyrethrum. It is noted that pilot studies with this insecticide are in progress in villages of Barabanki, (Uttar Pradesh) and Ernakulam (Kerala). The results obtained are reported to be encouraging but precise information would be available when the studies are completed, after which it would be possible to compute the costs of pyrethrum spraying.

#### LIMITATIONS OF DIETHYLCARBAMAZINE FOR MASS THERAPY :

From the data available it is seen that the coverage of population was variable in the mass administration of diethylcarbamazine in different units where it was undertaken. As low as 38.3 per cent of the population took the drug for all the five days in many units. The highest figure of coverage (93.6 per cent) for 5 days was reported only from one unit. The poor coverage of the population was found to be due mainly to the incidence of unpleasant reactions in some individuals due to the drug. It appeared that 7.3 to 37.4 per cent of the individuals who took the drug showed reactions (Appendix VI). The reactions\* were usually minor and transitory in a majority of the cases.

Data are also available to show that in some individuals, administration of the drug did not lead to complete disappearance of microfilaria. In certain cases the reduction in the level of microfilariae did not persist long.

It was also noticed that decline in the infectivity rate of mosquitoes after drug administration was not appreciable in most of the areas. A mass chemotherapeutic approach for the control of filariasis can become possible only when a non-toxic filaricide becomes available†.

#### ANTILARVAL OPERATIONS :

Larval control operations are recognised as an essential part of the programme for the control of *C. fatigans* in the urban areas. Recurrent antilarval measures connote the weekly application of oil on all mosquito breeding places. This would need an augmentation of staff for antilarval measures in the filaria control units. The Committee is informed that the States have been requested to take the necessary administrative steps for these changes in the staff of the N.F.C.P. units in August, 1960‡.

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\* PATEL, T.B., and PARANJPEY, P. (1958)...*Ind. Jour. Mal.*, **12**, 171-182.

† Perhaps the lessons learnt in this programme, where mass drug administration was tried on a large population are useful in their applicability to other public health programmes having mass chemotherapy as one of the measures.

The need for adequate health education of the masses cannot be minimised. The difficulties met within the Filaria Control Programme were not altogether due to want of publicity and health education, though in some areas this factor may have been an added cause :

‡ Because of the fact that the urban problem of culicine control especially in urban areas is so intimately associated with the problem of environmental sanitation and sewage disposal, it is suggested that a Public Health Engineer be incorporated into the programme. This was the recommendation by Dr. Henry Beye, U.S.T.C.M. Consultant for the N.F.C.P. in 1957. This was given due consideration by the Committee and in view of the fact that there is a Public Health Engineer at State level as well as in many of the municipalities, it was not considered necessary to have a Public Health Engineer attached to the Programme.



The review of the results of the 5 years of the control programme in the various States has shown that in the long run the answer is adequate drainage and disposal of sewage and sullage. In some cities like Ahmedabad, Bangalore, and Hyderabad which have an underground drainage system adequate at one time, have expanded to such an extent that the newer areas of the cities have yet to be sanita-  
ted to the same degree as the older areas. In the last mentioned place in the peri-  
pheral portions of the city, surveys so far conducted show that the microfilaria rate is 2.8 per cent and the disease rate is 0.1 per cent. It is, therefore, clear that even after the drainage is implemented, there will be need for a certain degree of mosquito control and vigilance against filaria transmission which can be established in the unavoidable extensions of almost every urban area.

The filariasis problem being widespread and obviously on the increase, sustained efforts would be needed to continue permanently in order to reduce it to a level sufficiently low, when it will cease to be a problem of public health importance. The role of environmental sanitation (adequate drainage and proper disposal of sullage and sewage) for the control of the disease has been emphasised. It has been pointed out that bancroftian filariasis is mainly a disease of urban areas, from where it spreads. At the present time, it is advisable to restrict the filaria control activities to urban areas, particularly Corporations, Municipalities and industrial townships. This in itself is likely to take care, to a great extent, to prevent a further spread of the disease in the surrounding rural areas.

In most areas where there are no proper drainage facilities invariably each house has a cess pit for the collection of ablution water. It is generally the experience that, however, successful the antilarval measures be in areas outside the house, some proportion of mosquito breeding continues to take place in the cess pits inside the houses. This element created organisation difficulties in its control, and, therefore, will have to be dovetailed with the existing scavenging organisation.

#### LIMITATIONS OF EXISTING METHODS OF COLLECTION OF DATA AND PROFORMAE FOR RECORDING THEM :

Reporting under the N.F.C.P. was planned in such a way as to obtain all possible data. Experience showed that certain data could not be adequately collected with the existing organisation ; others were not necessary for the assess-  
ment of the control measures. The question of revising/deleting certain proformae used in the N.F.C.P. was, therefore, discussed at the annual meeting of the filaria workers held at Jaipur in December, 1959. As a result of the deliberations, changes in some of the proformae were made and others deleted. Accordingly revised proformae (Appendix V) prepared by the Malaria Institute of India were sent to the States concerned in June, 1960.

#### RECOMMENDATIONS :

Based on a detailed study of the activities of the National Filaria Control Programme and discussions held with the Project Staff at various levels, the

Committee recommends the following for early implementation :

### 1. CONTROL MEASURES :

From the experience of the N.F.C.P. in the last 5 years, antilarval measures have been noted to be the only practical answer for the present, for control of Bancroftian filariasis in India. The roles of environmental sanitation (proper drainage, adequate disposal of sewage and sullage) for the control of disease transmission have been emphasised. The need for some degree of mosquito control even after drainage is implemented has also been brought out. The following recommendations are made in this connection.

The anti-larval measures would have to be continuous throughout the year and, therefore, a permanent organisation is essential. The crew will have to be dealt with under three categories, namely (a) for minor engineering, which will include filling of depressions, surface drainage where possible and the creation of lidos where neither of the above are practicable, (b) to desilt the existing drains and keep them free of vegetation and scum in order that oil may be applied efficiently and (c) for oiling. It is not easy to give a scale of personnel per unit population as it will obviously depend on the degree of existing insanitation, the amount of drain cleaning, the desilting and oiling to be carried out.

### 2. REORGANIZATION OF THE EXISTING CONTROL UNITS :

It would be recalled that each unit under the N.F.C.P. at present has on its sanctioned strength two medical officers and one Assistant entomologist (Appendix II) to cover a population of 3 lakhs. In most places the population under each unit consists of an urban and a rural component, in a ratio of 2 : 1. Areas with population less than 10,000 have been considered rural in this context.

### 3. PATTERN OF ORGANISATION OF THE EXISTING UNITS :

In the original planning a total of 78 units was envisaged to afford protection for the estimated population of 25 millions residing in endemic areas. Due to one reason or another the number of units in the first two Five Year Plan periods was restricted to 47 (to afford protection to about 14 million people). An analysis of the results obtained over five years of the programme has brought out many facts as summarised earlier in this section under the heading 'Lessons of the N.F.C.P.'

Keeping in view the fact that (a) at least 64.0 million persons reside in filarious areas in the country (Appendix XI) as compared to the original estimate of 25.0 million; (b) the need for basic changes in the organisation and methods of control as well as assessment, (c) the lack of knowledge in the organisational set up needed for the implementation of rural filaria control; and (d) the availability of funds under the programme in the Third Plan period, the Committee make the following recommendations in connection with the organisation, administration, methods and assessment of control. It is strongly urged that the financial implications (set out in later part of this section) be accepted and approved.



#### 4. CONSTITUTION AND FUNCTIONS OF THE NEW UNITS :

##### (i) *Organisation for control for different sizes of population in urban areas :*

As everywhere, in the areas endemic to *W. bancrofti* also, the population in unit communities varies in size. Therefore, the organisation for filaria control cannot be standardised to apply for all sizes of population. It will have to be considered, in the first instance, for a basic unit to cater for a minimum urban population in which it is practical at present to control filariasis. Multiples of such basic units, modified where necessary, can be formed for larger population sizes in large communities. In this context it may be stated that the census definition of "urban" and "rural" populations is not applicable for purposes of filaria control. The factors considered are (a) it is necessary to control urban filariasis to prevent its spread to rural areas, and (b) the population size should be "Viable" i.e. administratively and technically feasible and practical for control operations to be instituted.

##### (ii) *The problem in urban areas and types and number of units needed :*

The extent of the urban filariasis, the types and the number of units needed for the various States have been set out in Appendix XIII. The basis for calculations are (a) Census of India Paper No. 1 (1957) and (b) the available filaria survey reports. The financial implications of control in the urban and rural areas in the different States is set out in Appendix XIII.

##### (iii) *Staff and equipment suggested for each type of unit :*

The details regarding the staff, equipment and stores needed for each type of unit is set out in Appendix XIV. In working out the pattern for each type of unit, the following factors have been taken note of :

#### STAFF :

*Technical.*—It was noted that in many of the 47 units established thus far there were many staff deficiencies. This was particularly so in respect of Medical Officers. There is an acute dearth of Medical Officers in the country. Besides, the experience has been that even the ones available in the filaria units are not interested in the work. It was noted that non-medical biologist could replace the medical officers in those units. For the basic unit, it is recommended that one non-medical biologist should be responsible for a unit population of 75,000 to 1,00,000 and be provided with ancillary staff. Population units above this number would naturally have some more of these officers. It is felt that population units below 75,000 should be in charge of trained sanitary inspectors at the rate of one per 20,000 to 25,000 people.

On the above basis, categories of units are recommended as in Table XIII.

Details of staff for the basic unit and sub-divisions and multiples thereof are given in Appendix XII.

TABLE XIII

Category of unit		Population size
Basic Unit	A	20,000—50,000
	B	50,000—75,000
	C	75,000—1,00,000
	D	1,00,000—2,00,000
	E	2,00,000—5,00,000
	F	5,00,000—10,00,000
	G	10,00,000—20,00,000
	H	Above 20,00,000

*Supervisory.*—In addition to the field staff, essential supervisory staff to check the work of the antilarval crew has also been recommended. Some conveyance allowance has been recommended for this staff. The operational cost of the units has been the responsibility of the States in the first two Plan periods. No change is recommended in this pattern.

#### EQUIPMENT AND SUPPLIES : (Appendix XIV)

In the present programme with 47 units, (Map III) larvicidal oil is being supplied by the Centre at the rate of 10,000 gallons per lakh of population per year. This at best is an arbitrary figure and may have to be modified in certain localities. The spraying equipment on the basis of 12 compression sprayers per unit are also at present being supplied by the Centre. Additional sprayers (20 knapsack) have to be provided for by the State Governments.

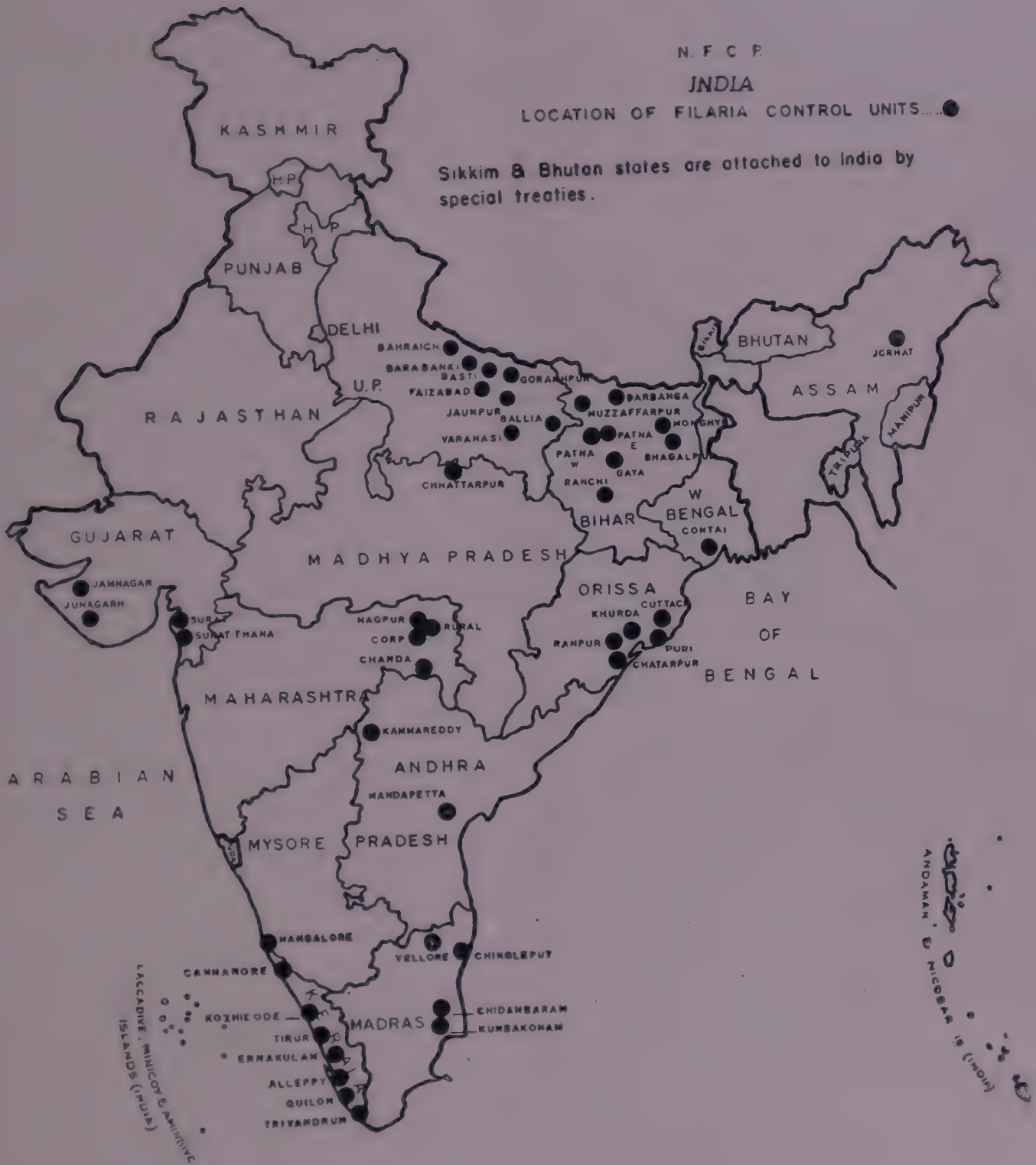
When the programme was started, the spraying equipment had to be imported and it was, therefore, simpler for the Centre to undertake procurement and distribute them to the States. Since all the equipment is now indigenously manufactured and easily available, it is recommended that the entire equipment should be found by State Governments. A rough estimate of needs of oil and spraying equipment is suggested for each type of unit. This may need changing with local experience. The oil, it is recommended may continue to be made available free of cost by the Centre.

#### TRANSPORT :

Considering the needs of the units, it is recommended that the transport should be made available only to certain categories of units. In this context, it may be pointed out that each of the existing 47 units has been provided with a station wagon and a jeep. In some cases the vehicles have become old and may in the near future become unserviceable. Some of the vehicles which have been recently supplied should be made available to the Assistant Director (Headquarters) as also the Research-cum-Training units. It is recommended that one station-wagon be allotted to the Assistant Director (Headquarters) and a jeep with trailer be made available to the officer-in-charge of the Research-cum-Training unit. These are local adjustments to be made by the DHS/DPH of the States concerned within the allotment already made.



MAP III.







## LABORATORY EQUIPMENT :

Under the N.F.C.P. only a Microscope has been given by the Centre to each of the units. The States were expected to provide the other essential laboratory equipment. It is noted that this has not been done by some States. In view of the altered pattern of units and to ensure proper collection of data, some laboratory equipment (Appendix XIV) is recommended to be made available free of cost by the Centre to the States.

## 5. ASSESSMENT OF RESULTS :

The objective being clearly defined as the reduction of transmission, the indices of assessment can be precise. The vector density, the amount of infection in the vector and the evidence of infection in the earlier age groups (5 to 15 years) would be sufficient to gauge year after year the reduction in the transmission and the efficacy of the control measures. The indices of assessment, therefore, are (a) the vector density, (b) infection rate in vectors, (c) infectivity rate in vectors and (d) the microfilaria rate in children between 5 and 15 years for the presence of fresh infections. The age groups have been so fixed that all the children can be contacted at school. It should not be difficult to organise a gathering of the students once a year to obtain a blood film from each between 8 and 10 p.m. Such longitudinal surveys (restricted to age-group 5 to 15 years) repeated once a year would give a more precise assessment of the control measures than any one of the epidemiological indices routinely used heretofore.

In addition to the above, a general trend of the progress of the decline of the disease manifestations can be obtained from the hospital and dispensary data by working out the annual proportion of filaria disease against the total attendance/admissions. Such data in the long run can even demonstrate the reduction of the incidence of the clinical manifestations in the absence of or reduced reinfection.

The clinical enquiries have not lent themselves to any analysis or conclusions. This type of investigation needs specially trained staff and regular house-to-house visits. It is considered that clinical enquiries can be suspended for the present and commenced only when a substantial reduction in the transmission is achieved.

As it is not possible for all types of units to collect the data earlier mentioned, the following modification is recommended. Units in categories B and C (Appendix XIII) will collect information regarding weekly mosquito density only and forward copies of report to the District Medical Officers of Health (D.M.O.H.)/Medical Officers of Health (M.O.H.) and Assistant Director (Filaria) at State level. The Assistant Director (Filaria) at Headquarters will send monthly statements to the Director, Malaria Institute of India.

*Units in higher categories (e.g.) C.D.E.F.G., etc. (vide Table XIII).*

These units will send monthly reports on mosquito density, infection and infectivity rates to D.M.O.H./M.O.H. as also 2 copies of the same to the Assistant

Director (Filaria) who will forward one set to the Director, Malaria Institute of India, with his comments. Such units, it is considered, should also carry out longitudinal annual blood surveys in children aged 5 to 15 years.

#### 6. ADMINISTRATION :

As stated earlier, the Filaria Control Programme in the different areas should be the direct responsibility of the existing district and municipal medical officers of health. In this connection, the Committee notes that there are still a few states where the municipal health officers are not borne on the strength of the State public health cadre. It is urged that they should be borne on the public health cadre of the State as it is general experience that in its absence, the quality of technical work suffers.

There should be good co-ordination between the local bodies and state health organisations on mosquito control work. Local bodies should earmark a proportion of their revenue for anti-mosquito measures. While all attempts should be made to have such work carried out by the department, it is realised that in some cases the local bodies themselves will have to do it with some subsidy from the State health departments.

The most important point is to ensure that larval control operations are extended beyond municipal limits and to ensure that there are no "No man's land" left uncontrolled, between two adjacent administrative areas. This includes cantonment areas as well. In such situations the formation of co-ordination committees is recommended, to be presided over by the Senior Officers of State Health Departments.

Every city should have an Anti-mosquito Committee of which the Municipal Chairman should be the President and the Medical Officer of Health, the Secretary of this Committee. Both official and non-official leadership should be represented on the Committee which should not be too large. This will ensure the channelisation of citizen participation into constructive implementation of anti-mosquito measures.

#### 7. AUGMENTATION OF TRAINING AT MALARIA INSTITUTE OF INDIA AND SUBSIDIARY CENTRES :

The Committee noted the useful work of the existing filariasis Branch at Ernakulam. In the last 5 years of its existence 77 medical officers, 195 inspectors and 27 entomologists have been trained for the different States and the Defence Organisation. The committee strongly feels that ultimately every district and municipal officer of health/medical officers in charge of primary health centres and selected officers from the Defence and Railway establishments and engineers in charge of town planning and civil construction should all be trained in filaria control methods. To cope up with such a target, the Committee strongly recommends the establishment of three more centres in the same lines as the one at



Ernakulam. The location of these centres in Kakinada (Andhra Pradesh), Rajkot (Gujarat) and Gorakhpur (Uttar Pradesh) seems to be most desirable.

It would seem desirable to extend the scope of the training to the administrative officers and executive officers of the local bodies to impress on them, their responsibilities and role in the control of this disease. Lastly, in view of the bancroftian filariasis being exclusively due to man-made conditions, all the engineers-in-charge of construction, design of either individual buildings or townships need to be acquainted with the problem. It is they who can contribute in a substantial measure to the avoidance, reduction and elimination of mosquito-genic condition which are often, left behind as a trail in the wake of many engineering constructions. To be able to carry out the above the Central staff of the N.F.C.P. needs to be augmented. Provision is to be made for the expenditure on the additional Training Centres.

#### 8. FILARIA SECTION OF STATE HEALTH DEPARTMENT :

Special Bureau for filariasis as a wing of the State Bureau of Epidemiology in the State in which filariasis is known to be a problem is considered essential. In this connection, it would be interesting to recall the observation of Christophers (1909)\* who stressed the need for a Headquarters Organisation in each State for Malaria control in the country. The foresight of the recommendation made 50 years ago is now seen in the spectacular success of Malaria control leading to its eradication in India.

In order that the technical supervision of the work of antimosquito officers may be carried out properly, as well as for surveys and assessment, it is considered necessary at this stage to have an adequately trained medical officer of health of the status of an Assistant Director of Public Health—at the State Headquarters. This officer should be responsible for scrutinising from the public health point of view the drainage schemes and should work in close co-operation with the public health engineering section and the local bodies. The responsibility for proper liaison towards eliminating the existing mosquito-genic conditions and prevention of new ones will be vested in him.

The Assistant Director (Filaria) should function as an epidemiologist and collect data, watch the progress of control, assess the results from time to time and make any changes in the organisation and methods that may be found necessary. He will also be useful in supervising and co-ordinating the activities of the different agencies like Industry, Railways, etc., for the control of the disease in the State. With this background he can also co-ordinate with the curative branch of the health services in order to obtain the maximum benefit of drugs in the case of symptomless carries. It is recommended that the formation of the filaria section of the epidemiological bureau in the States (Appendix VIII) be subsidised by the Centre for implementation.

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\* CHRISTOPHERS, S.R. (1909) quoted by COVELL, G. (1938) ... *Jour. Mal. Inst. Ind.*, 1, 1-31.

## 9. RESEARCH-CUM-TRAINING CENTRES :

It has already been referred to that at the present moment the organisational pattern for the control of rural filariasis are not available. This aspect has to be undertaken as a research project before it can be evolved for the control of rural filariasis. In the Third Plan period, it is, therefore, recommended that research be undertaken to evolve suitable methodology for the control of filariasis in the rural areas. For this purpose, the Committee recommends the creation of at least one Research-cum-Training Unit for each State with a filariasis problem. The unit is to consist of the following staff :

1. Medical Officer trained in Filaria	...	1
2. Mosquito control officer Gazetted (Non-Medical Biologist)	...	1
3. Inspectors	...	2
4. Field Assistants (Insect Collectors)	...	4
5. Superior Field Workers	...	2
6. Upper Division Clerk	...	1
7. Chowkidar	...	1
8. Peon	...	1
9. Field Workers	...	12
10. Driver	...	1

See Appendix IX for details of stores and equipment, etc. These units will be directly under the Assistant Director (Filaria) at the State Headquarters.

The above units in addition to carrying out research on the organisation and methodology of rural filariasis control in a population of about 20,000 will also serve another essential purpose, namely that of training different categories of ancillary personnel required in the State. The investigation area will serve as a training field in the teaching programme.

As in the case of the Headquarters unit, it is recommended that the Government of India subsidises these units to give the States the much needed fillip in this direction.

## 10. FILARIA CLINICS :

The Committee considered a note (Appendix X) prepared by the Director, Malaria Institute of India, Delhi, on the need for the establishment of filariasis clinics with the suggestion that the Central Government make a subsidy of twenty-one thousand rupees per clinic per annum. After detailed consideration of the note, the plan and operation and connected details, the Committee strongly recommends the establishment of such clinics in at least six places initially.



## 11. HEALTH EDUCATION :

To reiterate the obvious, the best health education in filariasis is the demonstration of positive results of its control. All methods, however, need to be adjusted which will increase the public consciousness regarding public responsibility in the effort to control the infection. To a certain extent this can be achieved through the routine methods of lectures, demonstrations, exhibitions, etc.

Health education for filariasis should be a continuous process for years to come. The Health Education Bureau of the State can explore giving demonstrations training courses for school teachers and other social leaders. The basic knowledge with regard to the disease can be incorporated into the school text books and the school museums.

From the point of view of Government employees, it is considered useful to include the examination of night blood for the presence of microfilaria as part of the routine recruitment medical screening. It is emphasised here that the presence of microfilariae in the blood is no bar whatsoever for recruitment. The educational value would lie in the fact that the person would become conscious of his infection which is amenable to treatment. It is envisaged that in the course of a few years, the educated public seeking employment would automatically get themselves examined and treated if found positive. It should not be difficult to extend this principle to other types of service in the private sector and industry.

It should be possible for the school health organisation to organise the examination of a night blood smear from each pupil and teacher once a year. These positive can be treated. Similarly at the annual camps of University Training Corps and school students at the N.C.C., night blood of all present could be examined for microfilariae on any one night during the camp session.

The mere routine examination of night blood from every patient, admitted to the hospital in endemic areas over a period of time will yield sufficient data not only with reference to the actual problem but also to elucidate the protein manifestations of the infections. This measure, if carried out in the teaching institutions in filarial areas, would in addition offer scope for research by the staff of the teaching hospitals.

## 12. FINANCIAL IMPLICATIONS :

The financial implications of the above recommendations are as follows :

The population living in endemic urban areas (as per current estimates and modified definition) is 24.08 millions. The financial requirement for the Third Plan period is 11.10 crores, the Central share being 3.85 crores and States' share being 7.25 crores. The present position in the Third Plan period for N.F.C.P. it is learnt is likely to be 8.0 crores. The allocation for the States it not yet known. It is strongly recommended that the minimum allotment required (Rs. 11.10 crores) be approved at an early date. (For details see Appendix XIII).

### 13. SUGGESTIONS FOR MODIFICATION OF EXISTING UNITS :

This would naturally depend on the final financial allotments made. As a general policy the existing staff should be channelised to the various types of units in the manner mentioned earlier. There will be a surplus of Medical Officers who could easily be absorbed in other public health programmes. There will, however, be a need for more Inspectors. The existing superior and ordinary field workers will, it is expected, be easily absorbed. Thus there will not be any unemployment but an employment prospect. This will not effect in any adverse manner the manpower requirements or employment potential.

It is not possible to allocate areas of priority. This is best left to the Directors of Health Services & Directors of Public Health to be carried out as hithertofore in consultation with the Director, Malaria Institute of India or his representatives.

### 14. RESEARCH :

Though last but not the least is the need for research. This has been amply stressed and brought out in Section IV. The Committee at every stage felt the need for research in almost every aspect of filariasis, namely, epidemiology, parasitology, entomology, chemotherapy, pharmacology, therapeutics and medical and surgical treatment. The lacunae have been explained and the approach to the solution of this problem has been discussed.

### 15. OTHER RECOMMENDATIONS :

The Committee considered the note prepared by the Director, Malaria Institute of India, Delhi, in respect of the *B. malayi* pilot control scheme in Kerala State.

The Committee fully supports the proposal and urges early implementation. The Committee would like to stress that the scheme be a fully centrally sponsored scheme as part of the National Filaria Control Programme to be organised and carried out in the Third Plan Period.

This would mean the following additional financial implications :

		Rs.
1961-62	...	4,86,000
1962-63	...	3,67,400
1963-64	...	3,70,400
1964-65	...	3,73,400
1965-66	...	3,76,400
Total :		19,73,600
		or
		20 lakhs



## APPENDICES

## APPENDIX I.

A Pilot scheme for control of *B. malayi* in Kerala State.

## INTRODUCTION :

Filaria endemicity due to *B. malayi* infection is known to be prevalent in restricted areas in India, the largest single endemic tract being along the coast of Kerala State. The concentration of the *B. malayi* incidence in Kerala State is in the district of Quilon, Alleppey, Kottayam, Ernakulam and Trichur and on many islands on the Vembaned lake. It is estimated that about 1.5 million people live in the endemic areas, stretching over 650 sq. miles.

The carrier mosquito is *Mansonioides* sp. It breeds exclusively in water collections containing certain types of aquatic vegetation. The breeding is facilitated by organic contamination e.g. retting of coconut husk for production of coir by the local persons where coir making forms a major cottage industry. Thus it would be seen that *B. Malayi* infection and disease are restricted to a geographically limited area.

It would be no exaggeration to state that the existence of this disease (*malayi filaria*) and its vector is totally unwarranted. Certain types of aquatic vegetations are indispensable for the vector mosquitoes to complete their life cycle. The aquatic vegetation serves no purpose in reality excepting to satisfy the age-old belief that it clears the turbidity of the water and keeps it cool. This vegetation also serves as a cheap source of manure. The usual practice in this area is for every household to provide itself with several small shallow ponds and stock each one of these deliberately with floating vegetation. When such wells are used for soaking the coir the organic pollution offers increased attraction for the breeding of these mosquitoes. Therefore, the coir industry *per se* does not contribute facilities for the breeding of the vector in the absence of the aquatic vegetation. Consequently in its primordial simplicity, the removal of the aquatic vegetation from all the tanks in this area and maintaining them free from them should eliminate for ever the mosquito and therefore the disease.

The incidence of the disease varies. Surveys carried out in the past (Iyengar 1938, Jaswant Singh *et al.* 1956) have revealed that in some of the affected areas the microfilariae rate ranges between 20 to 38 per cent while the proportion of persons with visible filarial disease ranges from 12 to 42 per cent. The efficiency of the affected persons is considerably lowered. The production of 'coir' and coir products, which is one of the major cottage industries of Kerala definitely suffer as a set back due to loss of manpower resulting from the crippling effect of the disease and the social discrimination the affected individual has to suffer, the disease has a profound adverse influence on the domestic and the national economy.

The adult mosquito—*Mansonioides* sp. unlike *C. fatigans* has been found to be very susceptible to DDT and BHC.



### Earlier studies on *B. malayi* control in India.

Iyengar (1938) described the intimate association of the *Mansonioides* mosquitoes, the vectors of *B. malayi* infection with the aquatic vegetation, *Pistia stratiotes*. The removal of pistia from the ponds in the areas has been attempted in localised areas of Shertallai and Ambalapuzha taluks. Practical difficulties in successful elimination of this water-weed are due to popular opposition to clearing of the vegetation.

Field trials were instituted by the Malaria Institute of India in 1954-55 and later by the State Health Department to test the efficacy of the synthetic insecticides in intercepting transmission of *B. malayi*. The results indicated the *Mansonioides* sp. are highly susceptible to BHC. At a dose of 40 mgm. gamma isomer per sq. ft. the residual effect of a single spray was observed to last over 20 weeks.

A field enquiry under the Director, Malaria Institute of India, (financed by the Indian Council of Medical Research) recently completed the investigations on the optimum dosage schedule of Diethylcarbamazine for mass administration in *B. malayi* areas. The enquiry revealed that the optimum dosage would be 4 mg./kg, once daily for 5 days. The administration of the drug was observed to be followed by varying degrees of reactions in some persons. In general the reactions were more severe than those in persons with *W. bancrofti*. It is felt that *B. malayi* control by insecticidal application alone is practicable in view of the high susceptibility of *Mansonioides* mosquitoes to the residual insecticides tested, and the innate difficulties in carrying out a mass drug administration campaign.

### The proposed pilot project for control of *B. malayi* in two districts of Kerala.

The project now proposed is to cover a population of about 5 lakhs in the Trichur and Ernakulam districts of Kerala State. The measure for intercepting transmission will be through indoor residual spraying. Recent studies have indicated that this measure by itself is likely to result in effective interception of transmission. It is proposed to carry out four rounds of insecticidal spraying in the year (20 mgm./sq. ft. of BHC gamma isomer) each round to take about 2 months, the monsoon period being a slack season.

Due to the inherent difficulties in drug distribution, it is not proposed to have a programme of mass drug administration of Diethylcarbamazine as is currently in force under the N.F.C.P. for *W. bancrofti*. It will, however, be carried out in institutions like schools, hostels, jails and other controlled groups of population—at a dose of 4 mg./kgm. once daily for 5 days by the Medical Officer and Social worker.

### THE ORGANISATION :

For convenience of administration and to ensure adequate supervision it is proposed to divide the area of operation into two zones. Each zone with a population

of 2.5 lakhs will be in charge of a zonal Medical Officer. The staff recommended and the duties of the Medical Officer for the zonal organisation are given in Annexure I (appended).

The indoor residual spraying operations will consist of four rounds of spraying, each round taking two months. BHC w.d.p. with 6.5 per cent gamma isomer—available within the country—is proposed to be used in the campaign. The dose will be 20 mg. gamma isomer per sq. ft. The entire area will be divided into 10 spray sectors each with a population of about 50,000 (about 10,000 houses) under one Inspector. To ensure adequate and proper supervision, it is desirable to assign only six pumps per Inspector. The average coverage is expected to be about 30 to 40 houses per pump per day or about 200 houses per Inspectorate per day. One round of spraying is, therefore, expected to be completed in 50 working days or two months.

The spraying season of 8 months will extend from 1st September of each year to 30th April of the following year. Due to inevitable delays in recruitment and training the following spraying staff is budgetted for 9 months :

Superior field workers	...	20
Field workers	...	180

Stirrup pumps are considered most suitable for these spraying operations.

Administration of Diethylcarbamazine will be limited to institutions and such controlled population where it can be supervised by the zonal medical officer, or the medical officer of a local dispensary assisted by the social worker of the zonal office. Mass drug administration to the general population is proposed to be carried out in one of the four villages under each zone, selected as index areas for special investigations.

The details of budget provision are given in Annexure II (Appended). The calender of activities for the field operations is set out in Annexure III (appended).

The assessment of the control operations will be based on both entomological and epidemiological observations as detailed below :

#### ENTOMOLOGICAL ASSESSMENT :

Four index areas will be fixed up in each zone. The population of each index area should be about 1,000. In addition to the mosquito control measures, the population of one of these will be covered by mass drug-administration. Regular fortnightly collection of mosquitoes throughout the year are to be carried out in these areas, covering two villages every week. The following entomological data will be collected to evaluate the efficacy of the residual spraying :

1. Vector density—determined by hand collection in fixed catching stations.
2. Infection and infectivity rates in the vector mosquitoes ; (mosquitoes for this purpose will include general collections also in addition to those from fixed catching stations).
3. Age determination of the vector by the Russian technique.



**EPIDEMIOLOGICAL OBSERVATIONS :**

Determination of the microfilaria rates, disease rates and mean microfilarial infestation will be done by a vertical examination in selected groups of population, rather than by a horizontal sample survey in the community. The surveys will be carried out during the off season every year, taking care to examine all the persons earmarked for the vertical survey. The entire population of about 1,000 in the area selected for mass drug administration in each of the two zones, and from hostels, resident institutions, jails, etc., will be examined during each survey.

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## ANNEXURE I.

## ZONAL STAFF :

Medical Officer	...	...	1
Assistant Entomologist	...	...	1
Inspectors	...	...	5
Social Workers	...	...	5
Laboratory Assistant	...	...	1
Insect Collectors	...	...	3
Laboratory Attendants	...	...	2
U.D.C./Steno	...	...	1
L.D.C.	...	...	1
Driver/Cleaner	...	...	1
Tin Smith	...	...	1

The duties of the Zonal Medical Officer will be :

- (i) Administration of the zonal office ;
  - (ii) Maintenance of accounts and disbursement of pay, wages, etc ;
  - (iii) Receipt and distribution of supplies ;
  - (iv) Maintenance of central stores and their distribution ; transport ;
  - (v) Collection of assessment data ;
  - (vi) Compilation and forwarding of progress reports.
-



## ANNEXURE II.

## Budget.

## 1. ZONAL STAFF :

Monthly

Medical Officer	...	420 × 2	...	Rs.	840
Assistant Entomologist	...	235 × 2	...	Rs.	470
Inspectors	...	165 × 10	...	Rs.	1,650
Social Workers	...	160 × 10	...	Rs.	1,600
Lab. Assistants	...	125 × 2	...	Rs.	250
Insect Collectors	...	115 × 6	...	Rs.	690
Lab. Attendants	...	85 × 4	...	Rs.	340
U.D.C./Steno	...	135 × 2	...	Rs.	270
L.D.C.	...	120 × 2	...	Rs.	240
Driver/Cleaner	...	120 × 2	...	Rs.	240
Tin Smith	...	130 × 2	...	Rs.	260
					<hr/>
					Rs. 6,850 × 12
					or
					Rs. 82,200 per year

## 2. INDOOR RESIDUAL SPRAYING :

Superior Field Workers	...	80 × 20	...	Rs.	1,600
Field Workers	...	75 × 180	...	Rs.	13,500
					<hr/>
					Rs. 15,100 × 92
					or
					Rs. 1,35,900

## 3. EQUIPMENT, TRANSPORT, ETC :

Jeep including trailer	...	18,000 × 2	...	Rs.	36,000
Compound Microscope	...	1,500 × 4	...	Rs.	6,000
Dissecting Microscope	...	150 × 4	...	Rs.	600
Office furniture	...		...	Rs.	4,000
Stirrup Pump including spares.	...	110 × 100	...	Rs.	11,000
Diethylcarbamazine tablets (1.8 million 100 mg. tablets @ Rs. 50 per 1000)	...		...	Rs.	1,00,000*
B.H.C. (6.5%) 50 tons @ Rs. 1,850 per ton	...		...	Rs.	1,00,000
	...		...	Rs.	15,000

## 4. CONTINGENCIES

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 Rs. 2,72,600
 

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\* It is proposed to utilise surplus Diethylcarbamazine with some States. This is likely to yield a saving of nearly a lakh of rupees.

## TOTAL BUDGET

*First year*

Zonal staff	...	Rs. 82,200
Spraying staff (seasonal)	...	Rs. 1,35,900
Equipment, transport	...	Rs. 57,600
Drug and Insecticide	...	Rs. 2,00,000
Contingencies	...	Rs. 15,000

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 Rs. 4,90,700
 

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*Subsequent 4 years.*

Zonal staff	...	Rs. 82,200
Spraying staff (seasonal)	...	Rs. 1,35,900
Insecticide	...	Rs. 1,00,000
Contingencies	...	Rs. 15,000

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 Rs. 3,33,100 × 4
 

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or

=Rs. 13,32,400

Anticipated total budget for 5 years of operation

=Rs. 18,23,100



## ANNEXURE III.

## Calendar of activities.

## PROCEDURE :

*Preparations**Date*

- |  |                   |
|--|-------------------|
| 1. Review staff position ; take action to ensure that all posts are filled.  | 1st—15th July.    |
| 2. Take stock of insecticide requirements stock position—receipt of supplies and distribution to the selected places check all equipment, replacements and spare parts.  | 16th—31st July.   |
| 3. Review advance spraying programme drawn up by the Inspectors—discuss spraying schedules at a conference with the Inspectors ; stock position of the insecticides, equipment and spare parts in their respective sub-units ; explain importance of complete coverage quality of spraying dosage Officer-in-Charge must satisfy himself that the Inspectors know how to prepare the suspension of the required concentration and check quality of suspension discharge rates and nozzle tips. | 1st—15th August.  |
| 4. Employment and training of labour—inform villages regarding spraying programme.   | 16th—30th August. |

## 2. SPRAYING OPERATIONS :

- 1st Round (Commence : 1st September—Complete : 31st October).  
 2nd Round (Commence : 1st November—Complete : 31st December).  
 3rd Round (Commence : 1st January—Complete : 28th February).  
 4th Round (Commence : 1st March—Complete : 30th April).

## 3. ASSESSMENT :

1. Entomological —Year round : fortnightly collection of data from index areas.
  2. Epidemiological—During May-June : A vertical examination of the population in selected areas—examining the same group year after year.
-

## APPENDIX II

The staff and operational cost of the Survey and Control Unit  
(All Categories) in the States

Category	No.	Duration	Pay Scale*
<b>Survey Unit</b>			
Filaria Officer	1	12 months	Rs. 275-25-500-E.B.-30-650-E.B.-30-800 (Initial start Rs. 350)
Laboratory Asstt.	1	12 months	Rs. 60-5/2-75-3-105
Insect Collectors	2	12 months	Rs. 60-5/2-75
Lab. Attendants	2	12 months	Rs. 35-1-40-2-60
Driver-cum-Mechanic	1	12 months	Rs. 60-5/2-75
Watchman	1	12 months	Rs. 30- $\frac{1}{2}$ -35
Total salaries including allowances. = Rs. 13,440			
<b>Control Unit</b>			
Filaria Officer	1	12 months	Rs. 275-25-500-E.B.-30-650-E.B.-30-800 (Initial start Rs. 350)
Research Officer	1	12 months	Rs. 275-25-500-E.B.-30-650-E.B.-30-800 (Initial start Rs. 350)
Assistant Entomologist	1	12 months	Rs. 250-15-400
Filaria Inspectors	2	12 months	Rs. 100-5-125-6-155-6-185
Stenographer	1	12 months	Rs. 80-5-120-8-200-10/2-220
Upper Division Clerk	1	12 months	Rs. 80-5-120-8-200-10/2-220
Insect Collectors	4	12 months	Rs. 60-5/2-75
Driver-cum-Mechanic	2	12 months	Rs. 60-5/2-75
Chowkidar	1	12 months	Rs. 30- $\frac{1}{2}$ -35
Total salaries including allowances = Rs. 30,180			
Staff for larviciding for 2,00,000 urban population.			
Supervisors	2	12 months	Rs. 100-5-125-6-155-6-185
Superior Field Workers	12	12 months	Rs. 35-1-50
Field Workers	70	12 months	Rs. 30- $\frac{1}{2}$ -35
Total salaries including allowances = Rs. 78,240			

\* According to Central State.



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Category	No.	Duration	Pay Scale*
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Staff for one application of insecticidal spraying in the urban area (2 lakh population) and 3 rounds in the rural area (1 lakh population).

Superior Field Workers	5	80 days	Rs. 80 p.m.
Field Workers	60	80 days	Rs. 75 p.m.

Total = Rs. 13,067

#### Staff for Mass Therapy

Superior Field Workers	40	6 months	Rs. 80 p.m.
Field Workers	40	6 months	Rs. 75 p.m.

Total = Rs. 37,200

Grand Total = Rs. 1,72,127

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\* According to Central Scale.

## APPENDIX III

## Material to be made available by the State for the Survey Unit of National Filaria Control Programme.

## I. LABORATORY EQUIPMENTS :

Microscope, Research Compound complete with mechanical stage	...	1	(In addition to one to be supplied by Government of India)
Dissecting microscopes (Monocular) Hand-legs, Magnification $\times 10$	...	2	

*Instruments :*

Dissecting forceps, blunt pointed	...	2
Forceps, curved or angled, fine pointed	...	2
Forceps, entomological	...	2
Scalpels	...	2
Scissors, fine pointed 4"	...	2
Scissors, large 8"	...	1

## II. MATERIAL AND EQUIPMENT FOR BLOOD WORK MOSQUITO DISSECTIONS :

Microscope slides 3" $\times$ 1"	...	20 gross
Slide boxes wooden, each to hold 100 slides	...	12
Slide trays, Card board, flat with lids each holding 20 slides	...	24
Vertical slide box, wooden, each to hold 100 slides	...	12
Diamond pencil	...	1 gross
Rubber teats	...	1 gross
Pipettes (for stains, larval collection, etc.)	...	$\frac{1}{2}$ gross
Glass tubing 11" long ( $\frac{1}{2}$ " bore)	...	48
Grease pencils, soft variety, blue	...	1 doz.
Grease pencils, soft variety, red	...	1 doz.
Tuberculine syringe 1 c.c.	...	1
Tuberculine syringe needles	...	2
Hagedorn Surgical, needles, straight No. 7	...	2 doz.
Wooden handles soft e.g. wooden penholders	...	6 doz.
Glass cavity with cover	...	1 doz.



Dissecting needles (ordinary sewing needles)	...	1 gross
Good quality cotton handkerchiefs for cleaning slides	...	4 doz.
Silk handkerchiefs	...	1 doz.
Plastic or rubber tubing, for sucking tubes	...	100 feet
Filaria survey proforma	...	1,000 sheets (S.F.I.)
Hone for sharpening needles, etc.	...	2
Trays (E.I.)	...	1½ doz. $\left\{ \begin{array}{l} 8'' \times 10'' = 6 \\ 4'' \times 6'' = 6 \\ 10'' \times 14'' = 6 \end{array} \right.$
Wash bottles, plastic	...	2
Staining racks	...	6
Staining racks for drying (wooden)	...	6

### III. ENTOMOLOGICAL EQUIPMENT :

Specimen tubes, corked, 3 inch $\times$ 1 inch	...	2 gross
Test-tube, 6" $\times$ $\frac{3}{4}$ " without rim	...	4 gross
Pins, entomological, double pointed nickel	...	2 doz.
Cork sheets, smooth, 11" $\times$ 4" $\times$ 1/16"	...	2 doz.
Cover glasses, $\frac{3}{4}$ " square	...	2 doz.
Jars with screw on top (Killner Jars)	...	6
1 lb. capacity	...	6
Entomological store boxes, 17½" $\times$ 12"	...	12
Hurricane lamp chimneys	...	2 doz.
Barraud's cages	...	1 doz.
Barraud boxes	...	6 of 10" diameter
Larval nets	...	6
Wooden racks for specimen tubes	...	6
Test tube rack	...	6

### IV. GLASSWARE AND MISCELLANEOUS :

Glass measuring cylinder, 100 c.c.m.	...	2
Glass measuring cylinder, 10 c.c.m.	...	2
Drop bottles—2 Oz.	...	6
Bottles, narrow mounted, stoppered 4 oz.	...	4
Bottles, narrow mounted, stoppered 2 oz.	...	6
Glass jars, wide mounted, 8 oz. with hollow flat stopper	...	6
Spirit lamps	...	2
Stove primus	...	1
Blow lamp	...	1
Cotton wool	...	8 lbs.

Filter-paper 6 inches	...	12 pkts.
Dusters	...	12
Lint	...	4 lbs.
Maximum and minimum thermometer with magnet	...	1
Wet and dry bulb thermometer	...	1
Bags hand	...	32
Clinical thermometer	...	1
Bags hand	...	12
Haversacks	...	4
Towels	...	6
Mosquito netting for cages	...	10 yards
Muslin for making nets	...	10 yards
Glass pestle and mortar, small	...	1
Wooden racks to hold specimen tubes 3" × 1"	...	12
Spoons, denser size	...	6
Cup enamel	...	6

#### V. CHEMICALS ETC.

Distilled water	...	q.s.
Absolute alcohol	...	w lbs.
Xylol	...	2 lbs.
Choloroform	...	2 lbs.
Glycerine		
Creasote		
Cedar wood oil		
Geimsa stain		
Canada balsam	...	100 c.cm.
Methylene blue (Medicinal)	...	q.s.
J.S.B. Stain I	...	4 oz.
J.S.B. Stain III	...	q.s.
Raisins	...	q.s.
Glacial acetic acid	...	q.s.
Formalin	...	4 oz.
Mosquito repellent cream or liquid(e.g.) DMP	...	1 lb.
Lysol, for cleaning slides	...	q.s.
Pyrethrum 1 per cent	...	q.s.
Plasticine	...	1 gallon
Washing soda	...	1 lb.
Soap	...	q.s.
Soap flakes	...	q.s.
	...	q.s.



Methylated spirit	...	q.s.
Common salt	...	1 lb.
Kerosine oil	...	q.s.
Petrol	...	q.s.
Duplicating oil	...	q.s.
Iron drums 4 gallon capacity with a tap for storing drinking water	...	1
Locks assorted	...	9
Box with shelves for transport of equipment	...	6
Petromax lamps	...	2
Hurricane lanterns	...	6
Watches, pocket	...	4
Torches complete (2 shelled)	...	6
Torch light cells	...	q.s.
Sprayers hand	...	4
Torch light bulbs	...	4 oz.
Match boxes	...	q.s.
Sweets for distribution to children	...	q.s.

VI. MEDICAL CHEST CONTAINING SIMPLE REMEDIES  
FOR USE IN THE FIELD

Aspirin or A.C. powder	...	1,000 doses
Tincture iodine	...	8 oz.
Soda Salicylas tablets	...	1 lb.
Tab. Soda Bicarb.	...	1,000
Sulphagunidine tablets	...	200
Sulphanilamide powder	...	8 oz.
Rosochin	...	1,000 tablets
Multivitamin tablets	...	1,000
Sulphur ointment	...	2 lbs.
Bandage assorted	...	4 doz.
Lint	...	2 lbs.
Cotton	...	4 lbs.
Forceps	...	2
Scissors	...	2
Forceps-artery	...	2

## APPENDIX IV.

Material required by the Control Unit of the National Filaria Control Programme to be supplied by the State Government except where stated otherwise.

## I. SPRAYING (FIELD EQUIPMENT) :

Power sprayers	2	} Supplied by Govt. of India under the National Filaria Control Programme.
Compression sprayers	12	
Stirrup pumps	25	
Four Oaks Ross or other type		
Knapsack sprayers (3½ Gall).	20	
Drums, Shovels, Mops Brushes, } Brooms for application of larvi- } cide, clean weeding desilting. }		q.s.

## II. TRANSPORT :

Jeep	1	} Supplied by Govt. of India under National Filaria Control Programme to be provided by the State.
Station wagon	1	
Jeep trailer	11	
Cycles (complete)	12	

## III. LABORATORY EQUIPMENT :

Microscope, Research Compound, complete with mechanical stage	1	In addition to one to be supplied by Government of India.
Dissecting Microscopes (Monocular)	2	
Dissecting Microscopes (Binocular)	1	
Hand-lens, magnification × 10	6	
Micrometer, ocular	1	
Micrometer, stage	1	
<i>Instruments :</i>		
Dissecting forceps, blunt pointed	2	
Forceps, curved or angled, fine pointed.	2	
Forceps, entomological	2	
Scalpels	2	
Scissors, fine pointed 4"	2	
Scissors, large 8"	1	

## IV. MATERIAL AND EQUIPMENT FOR BLOOD WORK AND MOSQUITO DISSECTION

Microscope slides 3" × 1"	20 gross
---------------------------	----------

Slide boxes wooden, each to hold 100 slides.	12
Slide Trays, Card board, flat with lids each holding 20 slides	4 doz.
Vertical slide box, wooden, each to hold 100 slides.	1 doz.
Diamond pencil	1
Rubber teats	1 gross.
Pipettes (for stains, larval collection etc.)	6 doz.
Glass tubing 11 inches long ( $\frac{1}{2}$ " bore)	1 gross pieces.
Grease pencils, soft variety, blue	2 doz.
Grease pencils, soft variety, red	2 doz.
Tuberculin syringe 1 c.c.	2
Tuberculin syringe needles.	1 doz.
Hagedern surgical needles, straight, No. 7.	2 doz.
Dissecting needles (ordinary sewing needles)	1 gross.
Soft wooden holders e.g. wooden pen holders.	6 doz.
Cavity cells with lids	1 doz.
Good quality cotton handkerchiefs for cleaning slides.	4 doz.
Silk handkerchiefs	1 doz.
Plastic or Rubber tubing, for sucking tubes.	100 ft.
Filaria survey proforma	1 q.s. (S.F. 1)
Hone for sharpening needles, etc.	2
Trays (E.I.)	1½ doz. $\left\{ \begin{array}{l} 8" \times 10" = 6 \\ 4" \times 6" = 6 \\ 10" \times 14" = 6 \end{array} \right.$
Wash bottles, plastic	2
Staining racks	6
Racks for drying slides (wooden)	6

#### V. ENTOMOLOGICAL EQUIPMENT :

Specimen tubes, corked, 3" x 1"	2 gross.
Test-tubes, 6" x $\frac{3}{4}$ " without rim	2 gross.
Pins, entomological, double pointed, fine, nickel.	2 oz.
Cork sheets, smooth, 11" x 4" 1/16"	24
Cover glasses, $\frac{3}{4}$ ", square	2 oz.



Jars with screw top (Kilner jars)	
1 lb. capacity.	6
Entomological store-boxes $17\frac{1}{2}'' \times 12''$	6
Hurricane lamp chimneys	12
Barraud's boxes	12
Barraud's cages	24
Larval nets	18 (12 of 10" diameter and 6 of 3" diameter)
Wooden racks for specimen tubes	12
Test-tube rack for holding a dozen each	6

#### VI. GLASSWARE AND MISCELLANEOUS :

Glass measuring cylinder, 100 c.c.m.	3
Glass measuring cylinder, 10 c.c.m.	3
Drop bottles—2 oz.	6
Bottles, narrow mouthed, stoppered 4 oz.	12
Glass jars, wide mouth, 8 oz. with hollow flat stopper	6
Spirit lamps	2
Stove Primus	1
Blow lamp	1
Cotton wool	8 lbs.
Filter paper 6 inches	6 pkts.
Dusters	12
Lint	4 lbs.
Maximum and minimum thermometer with magnet.	1
Wet and dry bulb thermometer	1
Clinical thermometer	3
Bags hand	12
Towels	6
Mosquito netting for cages	10 yards
Mosquito curtains	6 (3 large ; 3 small for human bait traps)
Muslin for making cages	10 yards
Glass pestle and mortar, small	1
Balance, portable	1
Wooden racks, to hold specimen tubes $3'' \times 1''$	12
Spoons, dessert size	6
Cups enamel	6

Buckets straight side, 4 Gall.	50	(will vary according to extent of larviciding to be carried out).
4 Gallon petrol cans, with tight closing caps	20	
$\frac{1}{2}$ Gallon measures	6	
1 Gallon measures	6	
B.H.C. wettable powder pliers	10	
Screw drivers 8" long $\frac{3}{8}$ " blade width.	10	
Spanners (adjustable 8")	10	
Crayon	q.s.	
Canvas Haversacks 14' wide (to carry tools).	10	
Spades	10	
Pick axes	5	
Chisels-iron (various sizes)	5	
Hammers (2 lbs.)	5	
Rope-Coconut fibre for drawing water 30' long.	5	
Tin cutter, 1 large 1 medium curved	2	
Nail puller	3	
Hand Saw 24"	1	
Fire buckets (round bottom)	4	
Fire extinguisher	1	for each vehicle.
Larvicidal oil	30,000	gallons. } Supplied by Govt. of
Diethylcarbamazine tablets (50 mg. each)	3.9	million } India under the
or 100 mg. each	1.95	million } National Filaria
		tablets. } Control Programme.
Hose-oil resistant rubber or plastic, length 15 feet.	30	pieces.
Filter Cloth, each piece 30" $\times$ 18"	20	pieces.
Asbestos String	1	lb.
Zinc Wire	2	lbs.
Paint, Black	1	lb.
Lubricating oil (Motor oil)	As required.	
Kerosine oil	As required.	

## VII. CHEMICALS, ETC. :

Distilled water	q.s.
Absolute alcohol	2 lbs.
Xylol	2 lbs.
Chloroform	2 lbs.
Methyl alcohol	10 lbs.

Glycerine	1 lb.
Cedar wood oil	1 lb.
Canada balsam	q.s.
Creosote	6 oz.
Geimsa stain	100 c.c.m.
Methylene blue (medicinal)	4 oz.
J.S.B. stain I	q.s.
J.S.B. stain II	q.s.
Raisins	q.s.
Glacial acetic acid	4 oz.
Formalin	1 lb.
Lysol, for cleaning slides	1 gallon
Plasticine	1 lb.
Washing soda	q.s.
Soap	q.s.
Soap flakes	q.s.
Common salt	1 lb.
Pyrethrum 1 per cent	4 gallons
Mosquito repellent cream or liquid repellent e.g. D.M.P.	q.s.
Iron drum, 4 gallon capacity with a tap for storing drinking water	1
Locks assorted	6
Box with shelves for transport of equipment.	4
Petromax lamps	2
Hurricane lanterns	6
Watches, pocket	6
Torches complete (two celled)	1 doz.
Torches light bulbs	4 doz.
Torch light cells	q.s.
Sprayers hand	4
Match boxes	q.s.
Sweets for distribution to children	q.s.

MEDICINE CHEST CONTAINING SIMPLE REMEDIES FOR USE IN THE FIELD : 1

Aspirin or A.P.C. powder	1,000 doses
Tincture Iodine	8 oz.
Soda Salicylas tablets	1 lb.
Tab. Soda Bicarb.	1,000
Sulphaguanidine	200
Sulphadiazine tablets	200
Sulphanilamide powder	8 oz.



Resochin	1,000 tablets
Multivitamin tablets	1,000
Sulphur Ointment	4
Bandage assorted	4 doz.
Lint	2 lbs.
Cotton	4 lbs.
Forceps	2
Scissors	2
Forceps—artery	2
Argyrol solution	8 oz.

**Note.**—The above equipment and materials are the minimum requirements of a control unit. Items of stationery have not been included in the list. Furniture for the unit is not entered.

Form No. M.T.-1 (Old M.T. 1)

## APPENDIX

## National Filaria

State :

### Filaria Control Unit:

H. Q. of Unit :

Area (Town/Village)

[illegible]

**Note:**—This form is to be filled in by the enumerator first. After entering the names of people in each house, four lines are to be left free. This register is meant for 40 houses. The form is to be used by the mass therapy team at a later date.

\*Tick if consumed, cross X if not consumed. If handed over, write H.O.

\*\*Enter in Arabic numerals number of round worms passed. If negative mark Neg. Under "Remarks" column against each name enter the age-group each person belongs to. The age groups are: I—Over 18 years, II—Between 12 & 18, III—Between 6 & 12, IV—Between 2 & 6, Children below are to be marked No. in red ink.

# V

## Control Programme

If therapy is discontinued its cause and day of discontinuance.	No. of round worms passed and day of therapy when passed**											How reaction was treated and result of treatment***	Remarks
	1st Day	2nd Day	3rd Day	4th Day	5th Day	Day after	1st Day	2nd Day	3rd Day	4th Day	5th Day		

\*\*\*Such an entry will facilitate therapy as group I gets 2 tablets of 100 mgm. daily : II—1½ tablets, III—1 tablet, IV—½ tablet and nil tablets for No. i.e. below 2 years. The drug be withheld from pregnant women, mental delinquents and acutely or chronically ill persons. Thus in the Remarks column against such persons an entry No. in red ink should be made. Such entries will facilitate the work of the drug distributor.

\*\*\*Reactions noted are to be entered as follows

N—Nausea, V—Vomitting; F—Fever; C—Constipation, D—Diarrhoea; B.P.—Body pains, H—Headache, P—Prurit; A—Abscess (specify part or lymphgland as I—Inguinal; A—Axillary); S—Swelling of any part or specific part or parts affected.

\*\*\*Treatment should be indicated APC—APC powder for headache; M—Fever mixture; P—Opening dose as Magnesium Sulphate for constipation; S—Sulphaguanidine tablets for diarrhoea. Results of treatment to be indicated, C—Cured; B—Better; W—Worse; exacerbation of disease they were having prior to therapy—E; Reduction of disease they had prior to therapy—R; Admitted to hospital—H; If advised hospitalisation—A.H.





**APPENDIX V (Contd.)**  
**National Filaria Control Programme**

**Filaria Survey/Control Unit No.**

**Vehicle Description**

**Regd. No.**

Supplies			Time		From	To	Mileage		Mileage done	Driver's name.	Purpose of Journey	By whom used	Signature of the user.	Signature of the Gazetted Officer	Remarks
Date	Fuel	Oil	Out	In			Out	In							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

## National Filaria Control Programme

*Extracts from Log Book of Vehicles.*

[illegible]

Remarks.

*Filaria Officer.*



Form No. G.-4 (Old G. 5.)

## APPENDIX V (Contd.)

## National Filaria Control Programme

Filaria Control/Survey Unit

### Number of patients treated in Public Dispensaries

District :

Month.

Dispensary	Number of patients treated		
	All diseases	Filaria only	
		Medical	Surgical (No. of cases operated)

*Filaria Officer.*

Date: \_\_\_\_\_

# National Filaria Control Programme

### Filaria Control Unit :

Consolidated dispensary statistics for.....

Number of patients treated for all cases and *Filaria*.

[illegible]

**Note: A=All cases**

**F = Filaria cases.**

## APPENDIX V (Contd.)

## National Filaria Control Programme

## Filaria Control Unit :

Data on larvicidal treatment (to be submitted to the Director, Malaria Institute of India, Delhi, every month).

Week	Sector No.	No. of men working		Quantity of oil used.	Balance of oil.	Quantity of any other larvicidal used (give particulars of the insecticidal formulation.	Remarks (give particulars of other antilarval measures (if employed)*
		Superior Field worker	Field worker				
1							
2							
3							
4							
5							

\* The extent of minor engineering operations like, filling, drainage, levelling etc. may be clearly indicated under this column.



## APPENDIX V (Contd.)

## National Filaria Control Programme.

Mosquito breeding report (to be sent monthly to reach A.D.P.H. and Director, Malaria Institute of India by the 10th of the following month (—)).

Headquarters of the Unit :

Report for the month of..... 196

Urban/Rural

Dosage of larvicidal oil applied

Area (name and details.)	Larval random collection	Type of breeding places checked	Average number of larvae and pupae per dip												Type of vegetation if present.	Remarks**
			1st week			2nd week			3rd week			4th week				
			A	C	No. of pupae	A	C	No. of pupae	A	C	No. of pupae	A	C	No. of pupae		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

(—) Checking for mosquito breeding should be carried out invariably on the day following larvicidal application in each area once a week. Ten dips should be made in each breeding place and 10-50 breeding places should be checked in each area depending on the size of the area.

\*'C' for Culex and 'A' for Anopheles larvae. Against the words C or A enter average number of larvae collected per dip.

\*\*Presence of 4th instar or pupae may be explained in the remarks column, against respective collection. Give particulars of other larvicidal measures, if employed.

Date :

Place

Filaria Officer.

## APPENDIX V (Contd.)

## National Filaria Control Programme

Filaria Control unit : Sample Sheet for registering record of Daily Collection of Adult mosquitoes.  
 Date of collection : Area (Town/Village)..... Fixed catching stations./Random stations. collection  
 Name of Collectors : Identified by.....

Details of shelter		Collected from shelter No.						
		1	2	3	4	5	6	7
Type of shelter ..... No. of mosquitoes collected ..... Average time spent by each ..... Details of collection		M   F	M   F	M   F	M   F	M   F	M   F	M   F
ANOPHELLINES + CULICOIDES								

**Directions for using this form.**

1. A simple notation for showing number of males and females collected is as follows :—  
Write number of males first, then a dash and then the number of females, as 0-6, 3-7, 5-6, and so on.
2. The collection made in individual stations should be shown separately.
3. Collection of mosquitoes should be made only from sprayed human dwellings.
4. Time spent should be shown as hours and minutes as follows :  
 0-30 means no hours 30 minutes.  
 3-20 means 3 hours and 20 minutes.  
 "Fixed catching stations collection" means once weekly collections from fixed catching stations :  
 "Random station collection" will also be carried out once a week, from human dwellings selected at random.

## APPENDIX V (Contd.)

## National Filaria Control Programme

Filaria Survey Unit

Filaria Control Unit.

Monthly Report of Adult Mosquitoes Collections for.....196  
(To be submitted along with any specimen for confirmation to the Director, Malaria Institute of India, Delhi)

Fixed catching stations/Random catching stations.

Date of Spraying      Insecticide      Dosage applied      Type of surface sprayed

Fixed catching stations				Random Catching Station			
Type of shelter	Human Dwelling		Total	Human Dwelling		Total	
Time spent	Hrs.	Mts.		Hrs.	Mts.		
Species	M	F	M      F	M	F	M      F	
Anopheles Quilicines							

Density for Ten Man hours (From fixed and Random Catching Station)

M = Male  
F = Female

All anopheles  
*C. fatigans*  
*Armigeres obturbans*  
*Latrodipus*

*Aedes* sp.  
*Mansonioides* sp.

Signature and designation of the Officer.



## APPENDIX V (Contd.)

## National Filaria Control Programme

State :

Headquarters

Annual consolidated data for adult mosquitoes (for the year 196 .)

Filaria Control Unit only :

To be sent to the Director, Malaria Institute of India, by the 20th January every year.

Sprayed Areas	Density for 10 man hours.												
	Jan.	Feb.	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.	Total
Total Men hours spent													
Number													
All species													
Anopheline													
Culex fatigans													
Other culicines													
Aedes sp.													
Mansonioides sp.													
Armigeres obturbans													
Lutain fuscans													
Total all species													
Per ten man hours													
All mosquitoes													
Culex fatigans													
Mansonioides sp.													
Other culicines													

Signature and designation.

# National Filaria Control Programme

**Headquarters of Unit:**

STATE

(Sample page of permanent register for dissection of mosquitoes)

[illegible]

\*Please show number of larvae against each column.

1. Sheathless microfilariae; 2. Sausage forms; 3. Preinfective stage; and 4. Infective larvae.

## APPENDIX V (Contd.)

# National Filaria Control Programme

Monthly report on Mosquito dissections (to be submitted monthly along with any dissected specimens, if necessary, for confirmation to Director, Malaria Institute of India, Delhi) for the month of....., 196 .

Filaria Control Unit:

**No. of slides despatched with detail/s regarding points to be clarified.**

Sl. No.	Area	Species dissected	No. dissected	No. Positive	*Number of mosquitoes showing different stages of infection										Remarks
					Head		Thorax		Abdomen			Malpighian tube			
					3	4	1	2	3	4	1	2	3	4	

• 1, 2, 3 and 4—refer to stages of development of the infection.

1. Microflariae with or without sheath.
2. Sausage stage.
3. Preinfective larva.
4. Infective larva (indicate also the number of 4th stage larvae in brackets).

†Indicate the infection rate, infectivity rate and average number of infective larvae per infective mosquito. Attach a separate sheet, if necessary, for the information required.

Place:

Date:

**Signature & Designation of Officer.**



**APPENDIX V (Contd.)**  
**National Filaria Control Programme**  
**MOSQUITO DISSECTIONS**

**Filaria Control Unit :**

Places from where collected with details

*Annual summary for the year .....196 .*  
 (To be submitted by 20th January to the Director, Malaria Institute of India, Delhi),

ANNUAL MOSQUITO DISSECTION REPORT										Special Study area	
Place of collection.	Month	Number dissected by species	Number of mosquitoes positive		Total number of larvae		Infection rate	Infectivity rate	Average Infestation per infective mosquito	Infection rate in malpighian tubules	
			All Stages	Infective stages only	All Stages	Infective stages only					
	January										
	February										
	March										
	April										
	May										
	June										
	July										
	August										
	September										
	October										
	November										
	December										
Place :											

Place :

Date :

Filaria Officer

## APPENDIX V (Contd.)

Filaria Survey Card (for use of the Unit—not to be submitted)

Control/Survey Unit:

Filaria Survey of Town/Village.....on.....between.....and.....hours.

Headquarters of Unit:

Sl. No.	House No. & name*	Name of person.	Father/Husband/Guardian's name.	Age Years	Sex	History or presence of**						Result of blood examination	
						Fever	R.U.	L.U.	R.L.	L.L.	Hyd.		Genital

Note: R.U. and L.U.=Right and Left upper extremities. Hyd.=Hydrocele. R.L. &amp; L.L.=Right and Left lower extremities.

\*Identification of these persons at subsequent surveys is important. Hence, ward/street/door number or other points of identification should be written.

\*\*Enter detail as present history of fever or swelling but not present at time of survey. H. Negative signs or symptoms need not be entered.

## APPENDIX V (Contd.)

## National Filaria Control Programme

Proforma to accompany five per cent slides for test check once in a month to be directly sent to the Director, Malaria Institute of India, Delhi, with a prominent marking N.F.C.P. on the outside.

Name of State Control/Survey Unit No.

Area from where collected  
(District, Taluk and Town)

Headquarters of Unit.

Description of slides despatched.

Date of collection.

I. Stain used.

(a) *Positive slides.*

- (1) Number of slides sent.....average infestation . . . mf . . . . .  
cmm (as calculated by the Unit. The respective counts of positive slides sent should be attached as an appendix to this proforma together with serial number of slides).
- (2) Species of microfilariae encountered. In case of mixed infections this should be mentioned in the proforma and against the slide number.
- (3) Any slide or slides requiring detailed examination should be sent separately packed and their serial number and points requiring clarification must be mentioned.

(b) *Negative slides.*

Number of slides sent (with serial number list to be attached).....

Place :

Date :

Signature

Designation of forwarding officer.



## APPENDIX V (Contd.)

## National Filaria Control Programme

Monthly report on Parasitological data from Unit No. .... of ..... State for the month of ..... 196 .  
(To be submitted to the Director, Malaria Institute of India, Delhi, to reach by 10th of the following month)

## Headquarters of Unit :

• Area surveyed

District (s)

Total population in the area :

Details of examination	Age groups—in years																																
	Below 1 yr.		1		2		3		4		5		6		7		8		9		10		11-20 yrs.		21-30 yrs.		31-40 yrs.		41-50 yrs.		Above 50 yrs.		Total
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	

- No. of persons examined.
- No. positive for microfilariae.
- Species of microfilariae.\*\*
- No. positive for disease
- No. positive for both.
- Average infestation per 20 cmm. of blood.
- Infection rate :
- Disease rate :
- Endemicity rate :
- Youngest age and sex examined :
- Youngest age and sex at which infection was noted :
- Youngest age and sex at which disease was noted :
- Youngest age and sex at which both infection and disease was noted :
- Youngest age and sex at which both infection and disease was noted :  
In case of persons with disease and microfilariae, a list showing type of infection, disease processes, counts of microfilariae 20 cmm. in respect of such persons is to be enclosed.

\* A separate proforma to be used for each area.  
\*\* For *W. bancrofti* used the letter 'B' and for *W. malayi* the letter 'M' together with the number of persons suffering from such infection.

Remarks : (a) Brief particulars regarding mass therapy and other control measures adopted with date, etc. are to be set out.  
(b) In case of control unit separate forms should be used for special study and comparison area.

Place :

Date :

Signature

Form No. S.F.-4 (Old S.F. 4)

## APPENDIX V (Contd.)

## National Filaria Control Programme

Filaria Control Survey Unit  
Headquarters of Unit :

\* Area surveyed

District (s)

Total population in the area :

Monthly report on Parasitological data from Unit No. .... of ..... State for the month of ..... 196 .  
(To be submitted to the Director, Malaria Institute of India, Delhi, to reach by 10th of the following month)

Details of examination	Age groups—in years																																
	Below 1 yr.		1		2		3		4		5		6		7		8		9		10		11-20 yrs.		21-30 yrs.		31-40 yrs.		41-50 yrs.		Above 50 yrs.		Total
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			

- No. of persons examined.
- No. positive for microfilariae.
- Species of microfilariae.\*\*
- No. positive for disease
- No. positive for both.
- Average infestation per 20 cmm. of blood.
- Infection rate :
- Disease rate :
- Endemicity rate :
- Youngest age and sex examined :
- Youngest age and sex at which infection was noted :
- Youngest age and sex at which disease was noted :
- Youngest age and sex at which both infection and disease was noted :

\* A separate proforma to be used for each area.  
\*\* For *W. bancrofti* used the letter 'B' and for *W. malayi* the letter 'M' together with the number of persons suffering from such infection.

Remarks : (a) Brief particulars regarding mass therapy and other control measures adopted with date, etc. are to be set out.  
(b) In case of control unit separate forms should be used for special study and comparison area.

Place :

Date :

Signature

Form No. C.A.-1 (Old C.A. 1)

## APPENDIX V (Contd.)

## National Filaria Control Programme.

Filaria Control Unit.....

State.....

## Advance Insecticide Spraying Programme.

(Notice to area to be sprayed)

Place.....

Date	Taluka or municipality or other Revenue Dn.	Name of villages or towns to be sprayed.	Camping Place.	Remarks.

Date :

Place :

Filaria Officer

Copy forwarded with compliments to :

The Assistant Director of Public Health (Malaria &amp; Filaria) for information.

The Collector.....District.....

The District Health Officer..... District.....

The President, District Local Board.....District.....

The Mamlatdar.....taluka with request that the programme be communicated immediately to the village officers, who should please be directed to be present in the villages at the time of visit of the spraying squads and give all assistance for completing the work successfully. The village officers should also be requested to inform the villagers, by beat of drum one day before the date of spraying. Similar action is requested for soliciting co-operation of the residents in town i.e. by public notices, beating of drums, etc.

Copy to :

Filaria Inspector concerned.

Note :— The information should be sent at least 15 days in advance.



# National Filaria Control Programme

# Superior Field Workers Daily Report

**Filaria Control Unit:**

Name of Superior Field Worker:

No. of round of spray I/II/III/IV

[illegible]

**Note:** The superior Field Worker should fill in this form every day and hand it over to his superior.

If the refusal rate is more than 10 per cent, the reasons for the same may be indicated in the remarks column.

Date:

Signature of Superior Field Worker



## National Filaria Control Programme

Monthly report of Insecticide Spraying Operation to be submitted to the Director, Malaria Institute of India by the 10th of every month.

**Filaria Control Unit:**

[illegible][illegible]

**Note :** The quantities of material used in each taluka should be totalled and the total quantity used by the whole unit should also be given on the last page of the spraying report. If necessary use more than one Sheet but put the Sheet No. at the top and indicate the total No. of Sheets submitted.

If the refusal rate is more than 10 per cent, the reasons for the same may be indicated in the remarks column.



Form No. C.A.-5 (Old C.A. 5)

## APPENDIX V (Contd.)

## National Filaria Control Programme

STATE :

Headquarters of Filaria Control Unit :

*Annual summary of Insecticidal spraying operations*

No. of villages in the Unit/Area

No. of villages sprayed.

Total population in the unit area.

Population of the villages sprayed.

Season of operations : from.....to.....

Insecticide Formulation used :

Quantity

Dosage of insecticide used :

mg./sq.ft.

Other insecticides used, if any :

Quantity

Total

Grand Total insecticides.....lbs.

*Details of spraying dates and dosages by taluks*

Taluks	Number of villages/towns	Number of villages/towns included in spraying	Round	Formulation and dosages	Date	
					From	To
			I II III IV			
			I II III IV			
			I II III IV			
			I II III IV			
			I II III IV			

Signature

Designation

Place :

Date :

## APPENDIX VI.

Percentage of treated individual who developed reactions during Mass Drug Administration under the N.F.C.P. (Unit-wise analysis).

State	Unit	No. of persons treated	Percentage of persons showing reaction on					Total per cent of persons showing reactions.
			1st day	2nd day	3rd day	4th day	5th day	
Uttar Pradesh	Barabanki	2,27,492	17.0	21.8	24.4	21.4	15.4	10.2
	Basti	2,82,979	0.005	25.1	32.0	25.1	17.8	
	Faizabad	1,99,153	20.7	25.6	24.6	18.3	10.7	28.8
	Ballia	1,90,267	3.4	27.3	31.6	24.5	13.2	16.8
	Gorakhpur	1,68,976	6.3	21.3	27.7	25.7	19.0	23.8
Bihar	Varanasi	1,93,491	7.6	29.5	31.1	23.3	8.5	10.3
	Monghyr	2,04,803	16.0	36.5	26.7	19.6	1.2	10.6
	Patna West	1,26,078	2.5	27.3	30.5	24.9	14.8	15.3
	Bhagalpur	1,86,062	...	27.0	29.4	24.4	19.2	34.7
	Daibhanga	1,94,938	9.2	22.2	25.9	23.6	19.1	9.5
Kerala	Gaya	2,19,872	0.9	36.6	29.9	21.2	11.4	9.6
	Ranchi	1,27,270	...	30.2	36.9	21.5	11.4	4.4
	Muzaffarpur	2,00,804	81.5	15.8	2.5	0.2	...	4.1
	Ernakulam	1,17,112	27.6	31.4	25.0	15.1	0.9	22.7
	Trivandrum	1,91,621	4.8	24.0	29.7	24.9	16.6	17.5
Bombay	Nagpur	1,59,903	7.3	25.1	26.3	23.3	18.0	37.4
	Porbander	31,516	3.0	21.0	32.0	24.4	19.5	13.6
Madhya Pradesh	Surat	73,245	0.8	25.8	29.4	24.3	19.7	23.9
	Chattarpur	2,37,683	7.8	32.4	29.5	18.4	11.9	7.3
Mysore	Mangalore	80,967	3.3	33.9	30.6	21.6	10.6	17.0
Madras	Kumbakonam	2,36,670	2.1	28.5	30.4	24.3	14.7	25.4
	21 Units	36.50	8.5	26.7	27.9	23.0	13.9	16.5

# APPENDIX VII.

## Results of mosquito dissections.

Unit	Details	April			May			June			July		
		1956		1957	1956		1957	1956		1957	1956		1957
		1956	1957	1958	1956	1957	1958	1956	1957	1958	1956	1957	1958
<b>Patna</b> (Sept. 1958 to Feb. 1959)	No. dissected	..	..	317	..	113	305	..	128	148	80	247	249
	Per cent 4th stage infection	..	..	0.0	..	0	0.6	..	0.7	0.6	10.0	2.4	1.2
	Per cent total infection	..	..	6.6	..	7	10.5	..	5.4	9.4	20.0	12.5	12.4
<b>Muzaffarpur</b> (Oct. 1957 to Feb. 1958)	No. dissected	..	379	411	..	287	589	..	110	836	..	..	753
	Per cent 4th stage infection	..	1.3	0.2	..	1.3	0.7	..	0	2.3	..	..	1.1
	Per cent total infection	..	18.2	5.3	..	15.0	5.2	..	18.1	7.0	..	..	7.7
<b>Gaya</b> (Sept. 1958 to Feb. 1959)	No. dissected	..	517	176	..	276	166	..	75	255	..	123	389
	Per cent 4th stage infection	..	0	0	..	0	1.8	..	0	8.6	..	0	6.1
	Per cent total infection	..	23.7	15.3	..	2.1	14.4	..	4.6	26.0	1.6	1.6	36.5
<b>Nagpur</b> (Feb. 1957 to Sept. 1957)	No. dissected	..	1995	305	188	1149	230	425	1104	207	600	1935	423
	Per cent 4th stage infection	..	1.02	3.9	0.3	0.2	0	0	0.7	0.4	0.3	0.3	1.1
	Per cent total infection	..	4.3	13.1	28.5	5.2	6.9	21.2	3.1	4.8	13.1	6.6	9.9
<b>Surat B.M.</b> (Sept. 1956 to Jan. 1957)	No. dissected	..	244	133	..	146	181	..	107	200	..	365	..
	Per cent 4th stage infection	..	2.8	0	..	4.1	0	..	3.7	0	..	0.5	..
	Per cent total infection	..	14.4	8.0	..	10.2	11.0	..	10.2	9.0	..	4.1	..
<b>Kozhikode</b> (Sept. 1956 to Feb. 1957)	No. dissected	..	93	116	..	176	336	..	156	648	..	189	614
	Per cent 4th stage infection	..	0.9	0	..	1.1	2.3	..	1.9	2.4	..	0.1	1.6
	Per cent total infection	..	6.4	5.2	..	6.2	9.8	..	8.3	12.8	..	0.5	12.2
<b>Ballia</b> (June, 1956 to Aug. 1957)	No. dissected	..	520	937	..	644	1200	..	319	726	..	608	958
	Per cent 4th stage infection	..	0	0.6	..	0.1	0.1	..	0.6	0	..	0.4	0.7
	Per cent total infection	..	2.6	2.1	..	0.7	1.7	..	1.8	0.4	..	1.6	1.7



# APPENDIX VII (Contd.)

Unit	Details	August			September			October			November		
		1956	1957	1958	1956	1957	1958	1956	1957	1958	1956	1957	1958
<b>Patna</b> (Sept. 1958 to Feb. 1959)	No. dissected	95	280	321	74	421	228	95	253	..	76	505	259
	Per cent 4th stage infection	3.1	4.6	4.6	2.7	0.4	4.3	3.1	0.3	..	0.1	0.3	0
	Per cent total infection	28.4	20.3	28.0	10.8	13.3	2.2	19.5	9.1	..	1.1	8.9	10.0
<b>Muzaffarpur</b> (Oct. 1957 to Feb. 1958)	No. dissected	..	47	639	..	368	670	..	380	382	..	480	231
	Per cent 4th stage infection	..	0	1.2	..	3.3	0.9	..	5.2	0.8	..	5.8	0
	Per cent total infection	..	17.0	8.1	..	13.4	7.6	..	16.8	6.5	..	12.9	5.6
<b>Gaya</b> (Sept. 1958 to Feb. 1959)	No. dissected	..	201	480	365	365	655	..	119	442	..	628	739
	Per cent 4th stage infection	..	0	0.6	..	0	6.4	..	0	0.4	..	0	0.1
	Per cent total infection	..	2.0	30.8	..	0.8	22.1	..	1.6	25.6	..	0	27.3
<b>Nagpur</b> (Feb. 1957 to Sept. 1957)	No. dissected	405	1638	274	315	738	383	336	794	454	176	734	253
	Per cent 4th stage infection	0.5	0.4	2.2	0.9	0.3	2.6	1.5	5.0	1.5	0	0.4	0.4
	Per cent total infection	12.1	7.5	8.0	15.0	9.3	6.0	12.2	10.4	8.0	10.8	7.9	5.9
<b>Surat B.M.</b> (Sept. 1956 to Jan. 1957)	No. dissected	..	301	307	..	421	379	94	196	235	152	262	147
	Per cent 4th stage infection	..	2.3	3.9	..	6.8	0.8	1.0	6.1	0.8	4.6	3.0	0.6
	Per cent total infection	..	10.2	9.4	..	14.7	7.7	40.4	14.2	8.9	33.5	12.5	8.8
<b>Kozhikode</b> (Sept. 1956 to Feb. 1957)	No. dissected	..	257	438	..	291	284	..	564	967	..	536	388
	Per cent 4th stage infection	..	1.2	0	..	2.5	0.9	..	0.5	4.2	..	0.1	0.7
	Per cent total infection	..	5.0	21.2	..	4.4	11.4	..	0.3	8.6	..	4.1	9.0
<b>Ballia</b> (June 1956 to Aug. 1957)	No. dissected	60	892	546	41	1342	866	98	1133	780	98	1016	528
	Per cent 4th stage infection	..	1.1	1.1	8	1.6	0.9	0	2.2	0.7	0	2.2	0.9
	Per cent total infection	3.3	3.2	2.3	0	2.4	1.4	0	3.5	1.9	0	4.2	2.4

# APPENDIX VII (Contd.)

Unit	Details	December			January			February			March		
		1957		1958	1956		1957	1958	1956		1957	1958	
		1956	1957	1958	1956	1957	1958	1956	1957	1958	1956	1957	1958
Patna (Sept. 1958 to Feb. 1959)	No. dissected	80	285	361	224	568	287	3.48	557	321	..	114	297
	Per cent 4th stage infection	1.2	0	0	0	0	0	0	0	0.6	..	2.4	0.3
	Per cent total infection	10.0	3.5	17.7	7.5	5.6	11.1	8.9	5.7	8.7	..	10.3	0.5
Muzaffarpur (Oct. 1957 to Feb. 1958)	No. dissected	304	537	305	390	585	333	170	480	564	297	328	..
	Per cent 4th stage infection	0	2.9	0	0	0.8	0	0	0.8	0.4	0	2.4	..
	Per cent total infection	12.5	8.3	4.2	15.4	7.3	4.2	14.1	5.6	4.9	17.8	1.8	..
Gaya (Sept. 1958 to Feb. 1959)	No. dissected	..	678	807	..	684	739	..	680	651	301	274	675
	Per cent 4th stage infection	..	0	1.1	..	0	0.3	..	0	0.6	0	0	0.3
	Per cent total infection	..	0	24.3	..	0	21.0	..	0.9	17.5	3.9	2.2	9.4
Nagpur (Feb. 1957 to Sept. 1957)	No. dissected	192	334	503	296	556	288	916	448	222	2246	404	245
	Per cent 4th stage infection	0.5	2.1	0	0	0	0	0.4	0	0.4	0.1	0.2	0.8
	Per cent total infection	8.2	5.9	3.5	10.0	7.0	4.5	5.3	8.2	6.3	3.8	6.9	6.5
Surat B.M. (Sept. 1956 to Jan. 1957)	No. dissected	180	246	282	216	213	341	123	211	303	220	183	147
	Per cent 4th stage infection	1.1	1.2	1.7	0.5	0	0.6	1.6	0	2.6	0.9	1.1	2.0
	Per cent total infection	15.5	8.9	9.2	14.8	7.6	7.6	21.1	2.8	8.6	14.5	6.9	9.5
Kozhikode (Sept. 1956 to Feb. 1957)	No. dissected	..	370	470	..	..	566	..	239	340	..	360	466
	Per cent 4th stage infection	..	0.2	0.4	..	..	0	..	0.4	0.3	..	0.5	0
	Per cent total infection	..	4.3	7.8	..	..	6.2	..	5.4	2.6	..	5.0	5.2
Ballia (June, 1956 to Aug. 1957)	No. dissected	107	525	718	720	558	743	486	599	522	463	646	774
	Per cent 4th stage infection	0	0.5	0.2	0	0.5	0.0	0.2	0.1	0.9	0.2	2.4	0.2
	Per cent total infection	0.7	0.7	1.1	0.6	0.7	1.1	0.6	2.1	2.4	0.2	2.7	2.2

## \*APPENDIX VIII.

## Cost of Headquarters Unit.

			Rs.	
Assistant Director (1)	700 × 12	...	8,400	
(Medical Officer of Health ; trained in Filariology)				
Assistant Entomologist (1)	350 × 12	...	4,200	
Laboratory Assistant (2)	130 × 12 × 2	...	3,120	
Clerk (1)	140 × 12	...	1,680	
Peon (1)	90 × 12	...	1,080	
Driver (1)	120 × 12	...	1,440	
			19,920	
Contingencies	...	...	3,080	
		Total	23,000	per annum

or 1.1 lakhs for five years.


\* Station wagon (one) to be transferred from existing N.F.C.P. units.



## APPENDIX IX.

## Rural-Research-cum-Training Unit.

		Rs.
One Medical Officer	...	4,800
400 × 12 × 1		
One Assistant Entomologist	...	4,200
350 × 12 × 1		
Two Filaria Inspectors	...	3,960
150 × 12 × 2		
15 × 12 × 2		
Four Insect Collectors	...	5,760
110 × 12 × 4		
10 × 12 × 4		
One Upper Division Clerk	...	1,680
130 × 12 × 1		
10 × 12 × 1		
One Driver	...	1,440
110 × 12 × 1		
10 × 12 × 1		
One Chowkidar	...	960
70 × 12 × 1		
10 × 12 × 1		
One Peon	...	960
70 × 12 × 1		
10 × 12 × 1		
		<hr/>
		22,760
Two Superior Field workers	...	1,800
75 × 12 × 2		
Twelve Field workers	...	10,080
70 × 12 × 12		
4,000 gallons of oil	...	8,000
One Vehicle	...	17,000*
T.A.	...	4,000
Contingencies	...	9,360
		<hr/>
		Total : 74,000
		<hr/>

 Recurring 57,000 per annum.

\* Jeep with trailer to be transferred from existing N.F.C.P. units.

**MAINTENANCE AND RECORD :**

The data collected shall be recorded at the clinic on standard proformae to be drawn up and supplied by the Malaria Institute of India. The maintenance of standardised pattern of records will help comparison of result of data collected at different centres and proper evaluation.

It is suggested that these clinics might in the beginning start functioning in a few of the important towns in areas known to be filarioid, e.g. Trivandrum, Pondicherry, Mangalore, Vizagapatnam, Patna, Cuttack, Jamnagar and Nagpur. The clinic, if considered feasible may function at more than one centre in the same town on different days of the week. A two years' experience of the clinics will enable one to decide on the establishment of such clinics in other areas.

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## APPENDIX X

**A scheme for establishing filariasis clinics attached to large hospitals  
in the States where filariasis is endemic.**

**BACKGROUND :**

There are many lacunae in our present knowledge of the epidemiology of factors precipitating elephantoid conditions in filarial disease and its treatment. While it is known that there is no method for combating the advanced manifestations of filarial disease except surgery, it is recognised that filarial infection and its sequelae are preventible. It is also known that in areas where the disease is prevalent, a good proportion of the people act as symptomless carriers and are responsible for transmission of the disease in the area.

The disease can be successfully controlled by breaking the links of transmission either by adopting anti-mosquito measures or use of drugs or a combination of both these measures. The object of the National Filaria Control Programme in India is to determine the most practical and economically feasible combination of the two measures to implement under different situations.

Mass administration of Diethylcarbamazine can help a great deal to bring about a temporary reduction in the microfilarial densities in the infected persons and thereby the reservoir of the infection in the community. This effect is transitory and probably lasts for about two years. Intensive anti-mosquito measures organised in the area following the drug administration can maintain the reduction in transmission and continuation of such measures can successfully reduce the incidence of the disease in the community. In practice, however, it has not been possible to treat the individuals to anywhere near 100 per cent of the targetted population. The untreated proportion of the population would thereby continue as reservoirs and maintain the transmission. One of the important factors which is responsible for this organisational failure is lack of health education with respect to the disease in the affected communities. It is, therefore, necessary to exploit all available facilities in the hospitals in the endemic areas in order to disseminate the basic information among the patients that attend the clinics and through them to their relatives and neighbours. The latter may often be symptomless carriers who are very important from the transmission point of view.

The institution of clinics for special diseases (V.D., T.B., Leprosy, etc.) is a common practice particularly in the teaching hospitals. It is expected that the establishment of filarial clinics will automatically stimulate research in teaching hospitals, while in the non-teaching hospitals it will serve to help dissemination of information regarding the disease and its transmission in the community. At the same time a proportion of the symptomless carriers who escaped the mass therapy programme under the N.F.C.P. would also get the treatment with Diethylcarbamazine and thereby help reduce the reservoirs of the infection.



The utility of such clinics in teaching hospitals has been discussed in the annual meetings of the Filaria Advisory Committee of the I.C.M.R. In the 1955 meeting it was considered desirable to establish two Clinical Research Units one at Trivandrum and the other at Calcutta. These did not materialise.

#### OBJECTS :

The main objective of the proposed clinics would be to study the various clinical processes of Filariasis in relation to their possible therapy. Investigations in these clinics could include the studies on (a) chemotherapeutic agents and (b) the utility of various drugs to control and eliminate the reactions following the administration of Diethylcarbamazine and (c) surgical treatment where considered advisable.

Investigations on other aspects like biochemical and pathological, etc., can be included depending upon the material and the facilities available for such investigations. These facilities are presumably available in teaching institutions.

#### PLAN AND OPERATION :

The clinic can be attached to the out-patients departments of the hospitals and should meet two or three times a week at the outset, depending upon the attendance. It is expected that in endemic areas the attendance will increase gradually, depending upon the attention and other facilities offered, in the clinic. Informal discussions with the heads of teaching hospitals (e.g. Trivandrum and Mangalore) have shown that all facilities for clinical research are available in the Institutions.

The diagnosis of infection in the symptomless carriers can only be made by microscopic examination of blood collected at night. For this reason the necessary laboratory facilities, even where they exist in the hospitals are not likely to be available for use of the filariasis clinics. It is felt that some laboratory staff may have to be made available to ensure collection and examination of such material for the clinic. Where laboratory facilities do not exist it is hoped that the provision of the laboratory staff detailed below will serve as nucleus for this essential work in such hospitals.

A social worker is considered very essential to facilitate the working of the clinics. Experience in similar clinics has shown that the provision of a social worker will go a long way towards making such clinics popular. The social worker will serve the useful function of contacting relatives of the cases that attend the clinics and he (or she) will also be able to induce family members of the infected persons to get their blood examined at the clinic and the treatment which at present is effective at that stage. It is estimated that one social worker will be adequate for every 150-200 persons attending the clinic during one week.

#### STAFF :

- (1) Physician should be available from the hospital staff.

(2) Social worker	...	One	} to be provided at each clinic
Lab. Technician	...	One	
Lab. Attendant	...	One	

**COST :**

While the facilities at the teaching hospitals for biochemical, pathological and other examinations will be made available for the purpose of clinic, the cost of all expendable material should be met from the budget of the clinic.

(1) *Staff (for each clinic)	Rs.
One Lab. Technician @ Rs. 150 (150-6-180)	1,800
D.A. for above @ Rs. 60.	720
One Social worker @ Rs. 150 (150-7-185-8-225)	1,800
D.A. for above @ Rs. 60	720
One Lab. Attendant @ Rs. 35 (35-1-40-2-60)	420
D.A. etc. for above @ Rs. 45 p.m.	540
H. R. @ Rs. 7	84
(2) Diethylcarbamazine† 8 lakh (100 mg.) tablets	14,000
(3) Contingencies.	1,000
<b>Total:</b>	<b>21,084</b>

**MAINTENANCE AND RECORD :**

The data collected shall be recorded at the clinic on standard proformae to be drawn up and supplied by the Malaria Institute of India. The maintenance of standardised pattern of records will help comparison of result of data collected at different centres and proper evaluation.

It is suggested that these clinics might in the beginning start functioning in a few of the important towns in areas known to be filarious e.g. Trivandrum, Pondicherry, Mangalore, Visakhapatnam, Patna, Cuttack, Jamnagar and Nagpur. The clinic, if considered feasible may function at more than one centre in the same town on different days of the week. A two years' experience of the clinics will enable one to decide on the establishment of such clinics in other areas.

\* The pay scales of the staff (Lab. Technician, Lab. Attendant and Social Worker) given are according to the Central Government Pay scales. In areas like Nagpur, Lucknow, Patna and Calcutta additional expense ranging between Rs. 400 to 600 p.m. will be involved on account of the varied rates of house rent, C. C. A. at these places.

† Calculated on the assumption that 200 new cases attend the clinic every week, and each case lead to the detection of one symptomless carrier. The course of treatment will consist of a dose of 200 mg. diethylcarbamazine twice a day over a period of 3 weeks.

## APPENDIX—XI

## Population at Risk—Urban and Rural

State	Population at risk (in millions)	
	Urban	Rural
Andhra Pradesh	2.90*	1.10
Assam	0.13	0.87
Bihar	2.00	3.00
Gujarat	1.00	1.00
Madhya Pradesh	0.40	0.60
Madras	2.00	1.00
Maharashtra	1.00	1.00
Mysore	0.15	0.35
Kerala	1.50	2.50
Orissa	1.00	5.00
Uttar Pradesh	10.00	23.00
West Bengal	2.0*	...
Total	24.08	39.42

\* This figure includes many areas with population between 5 and 20 thousands as also areas which are Rural as per Census definition of 5,000 and below.



## APPENDIX XII

## Types of Unit

## Pattern of staff and supplies.

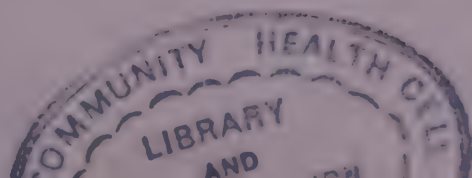
## A

		Rs.
One Senior Filaria Inspector	...	2,160
180 × 12 × 1		
One Filaria Inspector	...	1,980
150 × 12 × 1		
15 × 12 × 1		
Five Superior Field Workers	...	4,500
75 × 12 × 5		
Two Insect Collectors	...	2,880
110 × 12 × 2		
10 × 12 × 2		
20 Field Workers	...	16,800
70 × 12 × 20		
		<hr/>
		28,320
10,000 gallons mosquito larvicidal oil	...	15,000
12 Knapsack sprayers	...	2,400
4 Cycles	...	670
Contingencies	...	3,610
		<hr/>
	Total :	50,000
		<hr/>

	Centre	State
	Rs.	Rs.
Recurring + Non-recurring	18,070	31,930
Non-recurring	<u>    </u>	( 3,070

## B

		Rs.
One Senior Filaria Inspector	...	2,160
180 × 12 × 1		
Two Filaria Inspectors	...	3,960
150 × 12 × 2		
15 × 12 × 2		
		<hr/>
Total carried over		6,120

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		Rs.
	Total brought forward	6,120
Seven Superior Field Workers 75 × 12 × 7	...	6,300
Thirty Field Workers 70 × 12 × 30	...	25,200
Three Insect Collectors 110 × 12 × 3 10 × 12 × 3	...	4,320
	Total	41,940
15,000 gallons mosquito larvicidal oil	...	22,500
18 Knapsack sprayers	...	3,600
6 Cycles	...	1,000
Contingencies	...	5,960
	Total	75,000

	Central	State
	Rs.	Rs.
Recurring + Non-recurring	27,100	47,900
Non-recurring	4,600	

## C

		Rs.
One Biologist 350 × 12 × 1	...	4,200
Motor Cycle Allowance 50 × 12 × 1	...	600
One Senior Filaria Inspector 180 × 12 × 1	...	2,160
Three Filaria Inspectors 150 × 12 × 3 15 × 12 × 3	...	5,940
Ten Superior Field Workers 75 × 12 × 10	...	9,000
Fifty Field Workers 70 × 12 × 50	...	42,000
	Total carried over	63,900

		Rs.
	Total brought forward	63,900
Four Insect Collectors	...	5,760
110 × 12 × 4		
10 × 12 × 4		
One Store Keeper	...	1,680
130 × 12 × 1		
10 × 12 × 1		
One Chowkidar	...	960
70 × 12 × 1		
10 × 12 × 1		
One Peon	...	960
70 × 12 × 1		
10 × 12 × 1		
One Driver	...	1,440
110 × 12 × 1		
10 × 12 × 1		
		<hr/>
		74,700
Microscope Compound — 1	}	1,500
Microscope Dissecting — 1		
25,000 gallons mosquito larvicidal oil	...	37,500
36 Knapsack sprayers	...	7,200
8 Cycles	...	1,340
1 Power Wagon	...	17,000
Contingencies	...	8,260
		<hr/>
	Total Rs.	1,47,500
		<hr/>

	Centre Rs.	State Rs.
Recurring + Non-recurring	64,540	82,960
Non-recurring	27,040	

## D

		Rs.
Two Biologists	...	8,400
350 × 12 × 2		
Motor Cycle allowance	...	1,200
50 × 12 × 2		
Two Senior Filaria Inspectors	...	4,320
180 × 12 × 2		
Six Filaria Inspectors	—	11,880
150 × 12 × 6		
15 × 12 × 6		
		<hr/>
Total carried over		25,800



		Rs.
	Total brought forward	25,800
Twenty Superior Field Workers 75 × 12 × 20	...	18,000
Eighty Field Workers 70 × 12 × 80	...	67,200
Two Laboratory Assistants 110 × 12 × 2 10 × 12 × 2	...	2,880
Four Insect Collectors 110 × 12 × 4 10 × 12 × 4	...	5,760
One Storekeeper 130 × 12 × 1 10 × 12 × 1	...	1,680
One Upper Division Clerk 130 × 12 × 1 10 × 12 × 1	...	1,680
One Chowkidar 70 × 12 × 1 10 × 12 × 1	...	960
One Tin Smith 85 × 12 × 1 10 × 12 × 1	...	1,140
Two Peons 70 × 12 × 2 10 × 12 × 2	...	1,920
Two Drivers 110 × 12 × 2 10 × 12 × 2	...	2,880
	Total :	1,29,900
2 Microscopes (1 Compound & 1 Dissecting)	...	1,500
35,000 gallons larvicidal oil	...	52,500
72 knapsack sprayers	...	14,400
14 cycles	...	2,340
2 Power Wagons	...	34,000
Contingencies	...	15,360
	Total :	2,50,000
	Centre Rs.	State Rs.
Recurring + Non-recurring	1,04,740	1,45,260
Non-recurring	52,240.	

## E

		Rs.
One Filaria Officer (Non-Medical) ...		5,400
400 × 12 × 1		
50 × 12 × 1		
Two Biologists ...		8,400
350 × 12 × 2		
Motor Cycle Allowance ...		1,800
50 × 12 × 3		
Four Senior Filaria Inspectors ...		8,640
180 × 12 × 4		
Twelve Filaria Inspectors ...		23,760
150 × 12 × 12		
15 × 12 × 12		
Forty Superior Field Workers ...		36,000
75 × 12 × 40		
200 Field Workers ...		1,68,000
70 × 12 × 200		
Two Laboratory Assistants ...		2,880
110 × 12 × 2		
10 × 12 × 2		
Six Insect Collectors ...		8,640
110 × 12 × 6		
10 × 12 × 6		
One Store-keeper ...		1,680
130 × 12 × 1		
10 × 12 × 1		
One Upper Division Clerk ...		1,680
130 × 12 × 1		
10 × 12 × 1		
One Chowkidar ..		960
70 × 12 × 1		
10 × 12 × 1		
One Tin Smith ...		1,140
85 × 12 × 1		
10 × 12 × 1		
Three Peons ...		2,880
70 × 12 × 3		
10 × 12 × 3		
Three Drivers ...		4,320
110 × 12 × 3		
10 × 12 × 3		
Total carried over		2,76,180

		Rs.
	Total brought forward	2,76,180
4 Microscopes (2 Compound & 2 Dissecting)	...	3,000
70,000 gallons larvicidal oil	...	1,05,000
144 knapsack sprayers	...	28,800
24 cycles	...	4,000
3 power wagons	...	51,000
Contingencies	...	32,020
	Total	<u>500,000</u>

	Centre Rs.	State Rs.
Recurring + Non-recurring	1,91,800	3,08,200
Non-recurring	86,800	

## F

		Rs.
Medical Officer (Filaria Officer) 450 × 12 × 1	...	5,400
Five Biologists 350 × 12 × 5	...	21,000
Motor Cycle Allowance 40 × 12 × 6	...	2,880
Six Senior Filaria Inspectors 180 × 12 × 6	...	12,960
Eighteen Filaria Inspectors 150 × 12 × 18 15 × 12 × 18	...	35,640
One Upper Division Clerk 130 × 12 × 1 10 × 12 × 1	...	1,680
Sixty Superior Field Workers 75 × 12 × 60	...	54,000
Three Hundred Field Workers 70 × 12 × 300	...	2,52,000
One Tin Smith 85 × 12 × 1 10 × 12 × 1	...	1,140
	Total carried over	<u>3,81,700</u>



		Rs.
	Total brought forward	3,81,700
Two Senior Lab. Assistants/Technicians 150 × 12 × 2	...	3,600
Eight Insect Collectors 110 × 12 × 8 10 × 12 × 8	...	11,520
Two Chowkidars 70 × 12 × 2 10 × 12 × 2	...	1,920
One Store Keeper 130 × 12 × 1 10 × 12 × 1	...	1,680
Five Drivers 110 × 12 × 5 10 × 12 × 5	...	7,200
Four Peons 70 × 12 × 4 10 × 12 × 4	...	3,840
		<hr/>
		4,16,460
Microscopes—3 Compound } 3 Dissecting }	...	5,000
Mosquito larvicidal oil (1·2 lakh gallons)	...	1,80,000
Knapsack sprayers—228	...	45,600
Cycles (complete) 36	...	6,000
Power Wagons—5	...	85,000
Contingencies	...	61,940
		<hr/>
	Total	8,00,000
		<hr/>

	Centre Rs.	State Rs.
Recurring + Non-recurring	3,21,600	4,78,400
Non-recurring	1,41,600	

G

		Rs.
Two Medical Officers (Filaria officer) 450 × 12 × 2	...	10,800
		<hr/>
	Total carried over	10,800

		Rs
	Total brought forward	10,800
Six Biologists 350 × 12 × 6	...	25,200
Motor cycle allowance 40 × 12 × 8	...	3,840
Eight Senior Filaria Inspectors 180 × 12 × 8	...	17,280
Twenty-two Filaria Inspectors 150 × 12 × 22 15 × 12 × 22	...	43,560
Eighty Superior Field Workers 75 × 12 × 80	...	72,000
Three Hundred and Eighty Field Workers 70 × 12 × 380	...	3,19,200
Two Senior Lab. Assistant/Technician 150 × 12 × 2	...	3,600
One Upper Division Clerk 130 × 12 × 1 10 × 12 × 1	...	1,680
Ten Insect Collectors 110 × 12 × 10 10 × 12 × 10	...	14,400
One Tin Smith 85 × 12 × 1 10 × 12 × 1	...	1,140
Two Chowkidars 70 × 12 × 2 10 × 2 × 2	...	1,920
One Store Keeper 130 × 12 × 1 10 × 12 × 1	...	1,680
Six Drivers 110 × 12 × 6 10 × 12 × 6	...	8,640
Four Peons 70 × 12 × 4 10 × 12 × 4	...	3,840
		-----
		5,28,780
Microscopes—4 Compound } 4 Dissecting }	..	6,500
		-----
	Total carried over	5,35,280

		Rs.
	Total brought forward	5,35,280
Mosquito Larvicidal oil (1.27 lakh gallons)	...	1,90,500
Knapsack sprayers 238	...	42,600
Cycles (Complete) 39	...	6,500
Power Wagon 6	...	1,02,000
Contingencies	...	80,220
	Total	9,57,100

	Centre	State
	Rs.	Rs.
Recurring + Non-recurring	3,48,100	6,09,000
Non-Recurring	1,57,600	

## H

		Rs.
Two Medical Officers (Filaria Officers)	...	10,800
450 × 12 × 2		
Six Biologists	...	25,200
350 × 12 × 6		
Motor Cycle Allowance	...	3,840
40 × 12 × 8		
Eight Senior Filaria Inspectors	...	17,280
180 × 12 × 8		
Twenty-two Filaria Inspectors	...	43,560
150 × 12 × 22		
15 × 12 × 22		
One Hundred and Ten Superior Field Workers		99,000
75 × 12 × 110		
Five Hundred and Thirty Field Workers	...	4,45,200
70 × 12 × 530		
Three Senior Lab. Assistant/Technician	...	5,400
150 × 12 × 3		
Twelve Insect Collectors	...	17,280
110 × 12 × 12		
10 × 12 × 12		
Two Chowkidars	...	1,920
70 × 12 × 2		
10 × 12 × 2		
	Total carried over	6,69,480



		Rs.
	Total brought forward	6,69,480
Two Store Keepers	...	3,360
130 × 12 × 2		
10 × 12 × 2		
One Upper Division Clerk	...	1,680
130 × 12 × 1		
10 × 12 × 1		
One Tin Smith	...	1,140
85 × 12 × 1		
10 × 12 × 1		
Twelve Drivers	...	17,280
110 × 12 × 12		
10 × 12 × 12		
Four Peons	...	3,840
70 × 12 × 4		
10 × 12 × 4		
		<hr/>
		6,96,780
Microscopes—Compound 7 }	...	11,000
Dissecting 7 }		
Mosquito Larvicidal Oil (1.27 lakh gallons)	...	1,90,500
Knapsack sprayers 300	...	60,000
Cycles (Complete) 51	...	8,500
Power Wagons 12	...	2,04,000
Contingencies	...	77,220
		<hr/>
	Total	12,48,000
		<hr/>

	Centre	State
	Rs.	Rs.
Non-recurring + Recurring	4,74,000	7,74,000
Non-recurring	2,83,500	

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## APPENDIX XIII

*Details of requirements of States—Number, type of units and financial implications.  
(for urban areas only)*

State/Union territories	Needs of urban areas			Financial implications in lakhs of Rs. (urban areas)						
	Type	Number	No. of years in III Plan	Units Total amount State	Hq. Unit.	Research/cum-Training Unit.	Lab. Equipment	Total	Centre	State
1	2	3	4	5	6	7	8	9	10	11
Andhra Pradesh	G D C B A A	1 6 3 2 7 7	5 5 5 5 4* 3**	155.64	1.10	2.85	0.50	160.09	52.96	107.13
Assam	A B	2 1	5 5	8.45	..	2.85	..	11.30	5.70	5.60
Bihar	E D C B A	1 4 3 3 9	5 5 5 5 5	114.21	1.10	5.70	0.28	121.29	42.87	78.42
Gujarat	F E D B A	1 1 3 5 3	5 5 5 5 5	112.01	1.10	5.70	0.26	119.07	41.33	77.74
Madhya Pradesh	E D A	1 1 4	5 5 5	34.28	1.10	2.85	0.10	38.33	14.11	24.22
Madras	A B C D E	10 3 2 4 1	5 5 5 5 5	110.11	1.10	2.85	0.26	114.32	38.43	75.89
Maharashtra	H† F B A	1 1 1 3	5 5 5 5	105.01	1.10	2.85	0.08‡	109.04	37.95	71.09

\*Anakapalli, Bhimavaram, Srikakulam, Mahbubnagar, Pithapuram, Amalapuram and Parvatipuram.

\*\*Chirala, Gudivada, Palacole, Ongole Samalkot, Narasapur and Karimnagar.

†Refers to Bombay Corporation, needs further studies. Total for Bombay Corporation 60 lakhs of which 20 and 40 lakhs respectively will be the Centre and State Shares.

‡Bombay Corporation considered.

## APPENDIX XIII (Contd.)

1	2	3	4	5	6	7	8	9	10	11
Mysore	A D*	1 1	5 5 }	12.77	..	..	0.04	12.81	3.98	8.83
Kerala	E D C B A	1 2 4 2 8	5 5 5 5 5 }	93.82	1.10	2.85	0.22	97.99	33.68	64.31
Orissa	D B A	1 2 3	5 5 5 }	24.60	1.10	5.70	0.04	31.44	14.65	16.79
Uttar Pradesh	F E D C B A	2 3 2 2 2 12	5 5 5 5 5 5 }	202.30	1.10	5.70	0.46	209.56	68.70	140.86
West Bengal	C B A	6 9 5	5 5 5 }	82.07	1.10	2.85	0.12	86.14	31.28	54.86
Pondicherry	C	3	5	22.13	..	..	..	22.13	22.13	..
Andaman & Nicobar	A	1	5	2.50	..	..	..	2.50	2.50	..
Laccadive, Minicoy & Amindivi	A	1	5	2.50	..	..	..	2.50	2.50	..
Total				1082.40	11.00	42.75	2.36	1138.51	412.77	720.74

\* No headquarters or research-cum-training proposal as problem is small.



# APPENDIX XIV

Pattern of staff and supplies suggested to be provided to each filaria control unit.

## STAFF

Population (In 1000)	Biologists	Inspectors	Superior Field workers	Field workers	Insect Collectors	Store Keeper	Upper Division Clerk	Chowkidar	Peon	Driver	Tin-Smith
A 20—50	..	*1+1	5	20	2	..	..	..	..	..	..
B 50—75	..	*1+2	7	30	3	..	..	..	..	..	..
C 75—100	1	*1+3	10	50	4	1	..	1	1	1	1
D 100—200	2	*2+6	20	80	4	1	1	1	2	3	1
E 200—500	**1+2	*4+12	40	200	6	1	1	1	3	5	1
F 500—1000	+1+5	*6+18	60	300	8	1	1	2	4	6	1
G 1000—2000	+2+6	*8+22	80	380	10	1	1	2	4	6	1
H 2000 & above	+2+6	*8+22	110	530	12	2	1	2	4	12	1

\* Senior Filaria Inspector. \*\* Filaria Officer (Non-medical). † Medical Officer. ‡ Laboratory Assistant.

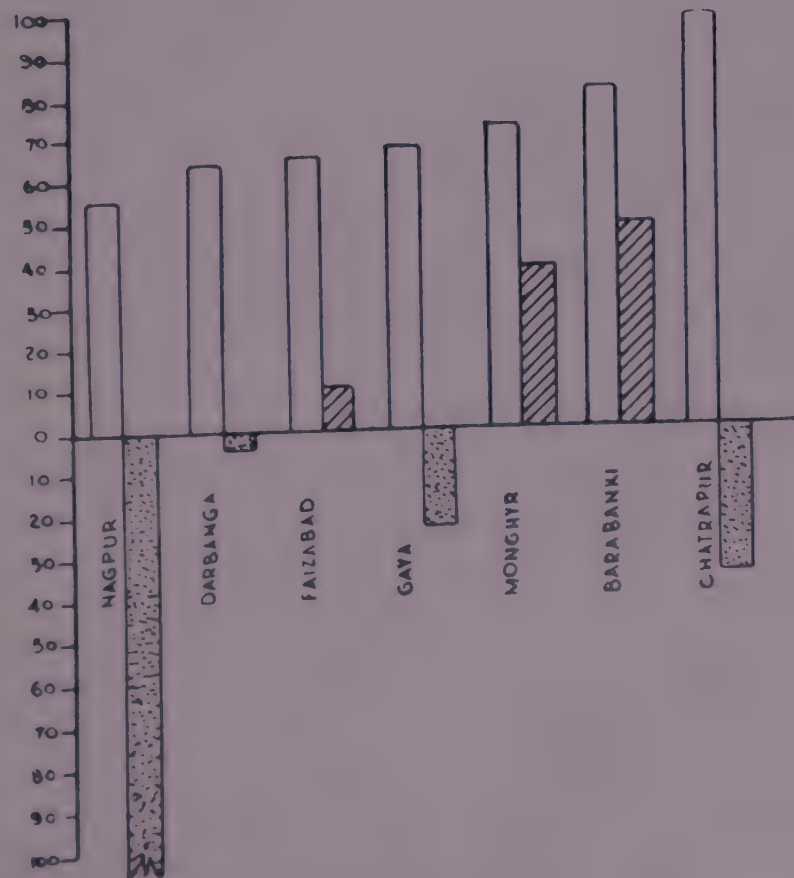
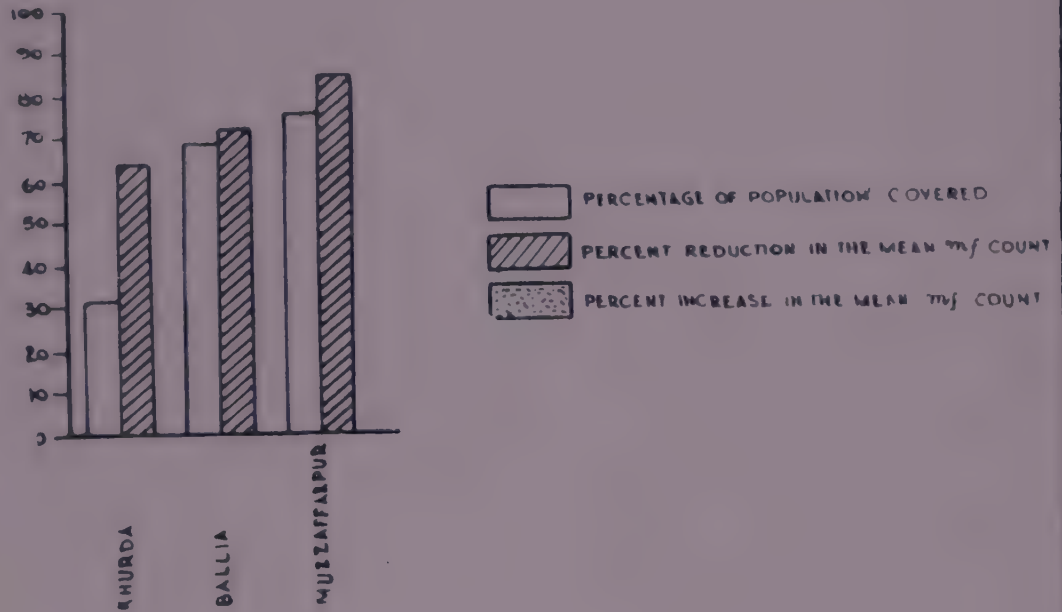
## SUPPLIES

Category of Station	Microscope		Mosquito Lar- vicidal Oil (1000 galls.)	Knapsack Sprayers. (with spares)	Cycle (Complete)	Power wagon (with spares)
	Compound	Dissecting				
A	..	..	10.0	12	4	..
B	..	..	15.0	18	6	..
C	1	1	25.0	36	8	1
D	1	1	35.0	72	14	2
E	2	2	70.0	144	24	3
F	3	3	120.0	228	36	5
G	4	4	127.0	238	39	6
H	7	7	127.0	300	51	12

Note : State Governments should provide from Contingencies Phaudas, Chamalas, Scythes, etc.



Per cent reduction in mean *Mf.* count in relation to population covered by  
Mass Therapy.







Percentage of persons treated for different No. of days during Mass Drug Administration.

